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[Special Editorial Correspondence by Telegraph.]

NINTH MEETING, WISCONSIN GAS ASSOCIATION.

HOTEL PFISTER, MILWAUKEE, WIS., May 13, 1910.

Dear JOURNAL: Beautiful weather greeted the members of the Wisconsin Gas Association as they met here yesterday for their ninth annual meeting. President R. B. Brown called the meeting to order in the commodious sessions room of the altogether satisfactory Hotel Pfister, and introduced the Mayor of Milwaukee, Mr. Seidel (he of the Socialist party), recently elected, who, in welcoming us, could not pass up the opportunity to bring in a few strong "explanatories" respecting his party's policy. Mr. David Douglas made the response, in speech and manner well calculated to bring the drowsy ones to "attention." The roll was called, and we adjourned. The afternoon session was opened with the presentation by the Acting Secretary (Mr. Henry Harman) of the annual reports of the Secretary and Treasurer, and right here let me add that, owing to the going from the State, to other fields of usefulness, of Secretary Hyde, to Mr. Harman should be awarded unstinted praise for his taking hold at such short notice of the duties attaching to the dual position. In fact no one could have gone on with the duties of keeping straight the combined desks in better shape than was done by Mr. Harman. President Brown's address, which was listened to with close attention, dealt largely with the work of the Wisconsin Commission, in so far as the labors of that body had to do with the gas industry of the State. It was also noteworthy in the announcing that an innovation in Association practice would be tried out, the departing from regular procedure being in the determination that the sessions were to be entirely formal, and that no stenographic report would be taken. The first paper read was that by Mr. J. B. Klumpp, of Philadelphia, on "Calorimetry," whose presentation was admirably punctuated by a series of lantern slides. It is hardly necessary to say that his theme was handled in as clear cut style mentally as his personality is precise. Mr. E. D. J. Dickey, of Beloit, here read a well-put together paper on "Conversion of a Low Pressure Distribution System to a Medium High Pressure System at Beloit," which provoked a highly practical discussion. The paper by Mr. C. Luebkeman, of Eau Claire, on the "Advantages and Disadvantages of Prepayment Meters," also caused a spirited debate, after which an adjournment was ordered until 7 P.M.; place, Milwaukee Athletic Club.—A. L.

Perhaps Thursday evening wasn't an evening! The dinner, to begin with, was as none other had been. Informal to a degree! Well, we sat on our kegs, and ate off cases—varied, of course; but this only added zest to the appetites and increased the flavors of the good things that were served us. In fact, the affair was beautifully crowned by constant exemplifications of the good fellowship that notably prevades this and the Michigan Associations. We broke up "fairly early," to be ready for tackling the technics of the closing day of the meeting. This was started by the election for office bearers, which resulted thus:

President—Mr. W. H. Winslow, Superior.
Vice-President—Mr. Robert Young, Sheboygan.
Secretary and Treasurer—Mr. Henry Harman, Milwaukee.
Delegate to Am. Gas Inst.—Mr. S. J. Glass, Milwaukee.

Mr. J. H. Walker, of Milwaukee, then read an excellent communication on that most vexing of subjects—"Water Heaters"—and was rewarded by a good discussion. Next in order was the paper by Mr. Guy F. Gregg, of Milwaukee, whose subject had to do with "The Advantages of Coke Screening." This ended the business proper, and altogether the meeting was interesting, spirited and profitable. That the State is waking up to the advantages of membership therein is best shown in the noting that the roll list was increased by the placing thereon of the names of 15 active and 12 associate members.—A. L.

LIBRARY OF CONGRESS, MAY 16 1910, WISCONSIN DEPOSIT.

SIXTH CONVENTION, SOUTHWESTERN ELECTRICAL AND GAS ASSOCIATION.

Telegraphic advices, signed "W. B. T.," from Beaumont, Tex., dated there at midnight of the 12th inst., and to hand at too late an hour (noon, Friday) to permit of their entire reproduction, go to show that the sixth convention of the Southwestern Electrical and

Gas Association, in session in Elks' Hall, Beaumont, was one well worth attending. President W. B. Head (Stephensville, Tex.), having called the sessions to order, introduced the Hon. D. P. Wheat (acting on behalf of Mayor Everett Fletcher), who welcomed the Association in hearty fashion, and his greetings were suitably acknowledged by Dr. H. S. Cooper, of Galveston. President Head's address, which was largely technical, especially in respect to the electrical side of the Association's work, did have something which appealed with equal force to all of its divisions—that public utility concerns, to be in certain degree successful, must "take the public entirely into their confidence. The Texas gas man discovered that featuring fact well over 20 years ago." The address was certainly an able one. The technical part of the programme held papers that were of much interest to gas men. These were: "Development of the Gas Business," by Mr. M. T. Walker, and the "Operation of Water Gas Apparatus," by Mr. M. J. Dewey. An excellent exhibition of appliances was also a feature of the convention; but the exhibits were mainly of the electrical order. The afternoon of the 12th was marked by an automobile ride in and around the "Spindle City," which was punctuated by stops at various points in the famous Beaumont oil fields, and an especially satisfactory delay was occasioned by the importunities (?) of the Country Club. The entertainment for the evening was a theater party, and refreshments "on the fall of the curtain."

BRIEFLY TOLD.

CURRENT MENTION.—

MR. BEN. W. PERKINS, since 1907 in charge of the office force of the Altoona (Pa.) Gas Company, has been appointed General Manager of the Hartford City (Conn.) Gas Company.

LAST week certain men employed by the Consolidated Gas Company, of Pittsburgh, Pa., rated as stokers, helpers and coal passers, to the total of 36, went on strike, the incentive being a disregarded petition for higher wages. Something over a year ago the prevailing wages rate was per diem: Stokers, $2.50; helpers, $2.25; coal passers, $2. During the intervening time the rate per diem was: Stokers, $2.25; helpers, $2; coal passers, $1.75. The strikers asked that the rate be restored in accordance with the former schedule, urging that when the cut was made a tentative understanding was had that, "when times had improved," the old schedule would become operative. This "time" the men assert has been reached. Our latest advices respecting the status of the case, which cover the 11th inst., are to the effect that the men resumed work, their continuing at such labors being dependent on the result of conferences between the strikers and the Company, the latter being represented mainly by Mr. Robt. W. Young.

ADVICES by way of Pasadena, Cal., under date of the 1st inst., are to the effect that Mr. J. R. Anderson and associates, of that city, are in Ashland, Ore., where they are starting plans for a vote by the people of Ashland on a proposition to grant the syndicate a franchise for the construction and operation of a gas works, the franchise to have a life of 35 years. Anderson and his associates have already received a franchise for the outlying settlement of Medford, and their proposal (in case the Ashland authorities assent) is to construct a plant midway of the places named, the supply to be carried out under the high pressure system.

MR. EMIL G. SCHMIDT will retire from the office of General Manager of the Public Utilities Company the 1st prox., and his successor is Mr. A. A. Anderson, of Columbus, O. While the headquarters of the latter will be in Springfield, Ills., he will not have jurisdiction similar to that possessed by Mr. Schmidt over the Company's plants in Peoria, Ills., and Evansville, Ind.

AT a meeting of the Scranton (Pa.) Lees Gas Governor Company's Directors, held recently in Scranton, Mr. G. W. Halstead was elected President and Mr. Chas. E. Jenkins was appointed General Manager, vice Mr. James C. MacColl, resigned.

AT the annual meeting of the Georgetown (Del.) Gas Company the officers elected were: President, Dr. G. Frank Jones; Vice-President, Robert O. Houston; Secretary and Treasurer, George W. Jones; Manager, L. L. Lawton; Superintendent, Joseph G. Green—a full complement.

THE New Haven (Conn.) Gas Company is extending its main system to and through the outlying district of East Haven.

"A. D. L." is informed that Mr. Fred. C. Butler is now acting as Superintendent of the Greenfield (Mass.) Gas Company.

AT the annual meeting of the shareholders in the Scranton (Pa.) Gas and Water Company the officers chosen were: Directors, W. W. Scranton, James Archibald, E. P. Kingsbury, George B. Smith and W. Scranton; President, W. W. Scranton; Secretary and Treasurer, Joseph Jaffrey.

HEREAFTER the residents of Brazil, Ind., will pay $1.15 per 1,000 cubic feet, net, instead of $1.25. The reduction dates from the 1st inst.

THE proprietors of the Hadley (Mass.) Lighting Company have applied to the Massachusetts Board of Gas and Electric Light Commissioners for the right to issue capital stock to the amount of $10,000.

THE proprietors of the El Paso (Tex.) Gas Company have announced that they would expend $125,000 on plant betterments this year. At the same time it was resolved to cut the selling rate to $1.35 per 1,000 cubic feet, the concession to become effective the 1st prox.

THE proprietors of the Northwestern Gas Light and Coke Company, of Evanston, Ills., have increased the capital stock from $4,175,000 to an even $5,000,000.

THE Borough Board, of Southington, Conn., is seriously considering the advisability of replacing the incandescent electric lighting lamps now in service on the city's streets with lamps of the gas arc type.

"S. M. E.," writing from Scranton, Pa., under recent date, incloses the following: "Another large concern in this city has switched over from electricity to the improved system of gas lighting. At the Woolworth 5 and 10-cent stores, on Lackawanna avenue, after various trials for the proper illumination of its huge shop with electricity, having failed to obtain an economical, brilliant, uninterrupted and effective distribution of light, the management of that progressive enterprise turned the lighting of the store over to the Scranton Gas Company. As a result this store is a ball of sunlight from the cellar to the top floor of the building. There is a display of 15,000-candle power from decorative and brilliant inverted arc lamps distributed through the store, with 10,000-candle power of light in inverted pendent lamps in single mantle units, so installed and operated in such sections as to render the best and most effective lighting and decorative effects."

Bureau of Information, The American Gas Institute.

Under the direction of the Institute it has been decreed: 1. That the privilege of submitting questions be limited to members of the Institute. 2. Neither the Board of Directors of this Institute, nor the Institute as a body, make themselves in any way responsible for the statements of fact or expressions of view given out by the Bureau of Information.

BUREAU OF INFORMATION, THE AMERICAN GAS INSTITUTE,
HEADQUARTERS, GAS OFFICE BUILDING,
V. F. DEWEY, Chairman. DETROIT, MICH., May 6, 1910.

ANSWER-AT-LARGE TO QUESTION NO. 65.

Question No. 65.—"Under ordinary conditions, does increasing the yield of gas per ton of coal carbonized decrease the candle power?"

It is, of course, self-evident that, if all other conditions remain the same, increasing the yield of gas per ton of coal carbonized would decrease the candle power, but nobody can say definitely what difference in yield would be expected in lowering the candle power from 18 to 16. It will be necessary to know, to even make an approximate guess, whether the candle power is measured in an Argand burner or by an open flame.

If the time of carbonization remains the same, and the yield is increased by increasing the temperature of the retort, the increased temperature itself would tend to reduce the candle power and thus introduce a disturbing element. If the yield should be increased by reducing the charge with the time the same, or by increasing the time of carbonization with the same weight of coal, different results might be expected in each case. The kind of coal used, the size of retort and the method of charging would also have an influence, so that in my opinion the only way the question can be answered is by the making of actual experiment by the works desiring the information.

I might venture as a guess that, if the candle power is measured on the open flame, the product of the yield by the candle power or the candle feet would be very nearly the same with 16-candle power gas as with 18-candle power gas. If the candle power is measured in an Argand burner I would expect a small increase in the candle feet.—E. H. EARNSHAW, Ass't Gen. Mgr., Public Service Gas Co., Newark, N. J.

[Official Report—Concluded from Page 904.]

SECOND ANNUAL CONVENTION, PENNSYLVANIA GAS ASSOCIATION.

Held in Heptasoph Hall, Easton, Pa., April 13-15, 1910.

Third Day—Morning Session.

The next paper, which was by Mr. L. S. Williams, of Harrisburg, is as follows:

AUTOMOBILE AND MOTOR CYCLE EXPERIENCES.

The use of automobiles and motor cycles, as means of transportation, has during the past few years grown to such an extent that it has passed the experimental stage and is now regarded by progressive business men as a necessity in successfully carrying on their business. The advisability of the employment of this means of transportation by gas companies should depend somewhat on local conditions, such as the size and character of the territory to be covered and the amount and character of the work to be done. The Company which the writer represents purchased an automobile, of the runabout type, for the use of the manager during 1909, and while the experience in its use is not very extensive, it may be interesting to those who have such a purchase in mind.

The territory supplied by this Company is somewhat scattered and consists of one city with about 50 miles of pipe, and 7 outlying boroughs with about the same length of pipe, making a total of approximately 100 miles of pipe lines to be covered. The problem of keeping in close touch with work going on in the different parts of the system, and the difficulty in doing so with the means then in use led to the consideration of the use of some means of quick transportation, and an automobile was decided upon. The following shows the cost of operating this automobile for a period of 7 months in 1909:

	Cost.	Cost per Mile Run.
Gasoline, 592 gallons	$77.40	0.01047
Oil and grease	24.06	0.00325
Tire repairs	18.40	0.00249
Repairs	58.25	0.00788
Garage storage, cleaning, etc	70.60	0.00947
Sundries	38.84	0.00525
Total	$286.95	0.03981
Total mileage		7,386
Total mileage per gallon of gasoline used		12.4

This car was used exclusively for supervision purposes, not for transporting material, and the experienced gained from its use indicates that it is a very valuable adjunct to the equipment of the Company. While it is impossible to point out any direct saving, in the way of lowering operating costs that has resulted from its use, there is no doubt that the ability to keep in close touch with all work going on is a valuable asset and aids in keeping down the cost of work.

Motor Cycles.—The use of motor cycles as a means of quick transportation was first tried in the winter of 1907, at which time a motor cycle was purchased for the use of the shop foreman, to enable him to keep in close touch with all work going on in his department. It was found that by its use much more work could be obtained from the men, by reason of close supervision, and that, of course, resulted in lower operating costs.

In 1909 a second motor cycle was purchased for the use of complaint men. By its use very quick response could be made to urgent orders and complaints, and the number of such orders attended to by one man was very largely increased.

No attempt has been made so far to use the motor cycles for delivery of material, although that phase of the matter is being considered and very probably it can be used profitably in that manner.

During the year 1909 the cost of operating two motor cycles (including repairs) amounted to $201.81. I am unable to give the cost per mile run or the mileage per gallon of gasoline used, as the machines were not equipped with cyclometers.

The use of motor cycles during the winter months, when snow is on the ground, will be found almost out of the question; but, under ordinary conditions, its value as a means of quick transportation is not to be questioned. I do not wish to be understood as advocating the general use of automobiles and motor cycles by all gas companies; but where distances are great and enough work is going on to make quick transportation a factor, I do think that the use of such machines is profitable.

Motor Trucks and Delivery Wagons.—Motor trucks and delivery wagons are being used in increasing numbers throughout the country, particularly by large express companies and business firms handling large quantities of goods; and, while the development of cars for such purposes has been slower than for pleasure purposes, yet the increase has been steady and the indications are that, in a very short time, trucks and light delivery wagons will probably be in more general use.

Their advantages over the horse-drawn vehicle are great, and with a better understanding of the machines and their capacity for all kinds of work, there will undoubtedly be a great increase in their use. In purchasing an automobile for any purpose many points must be considered - the cost of the car, the cost of storage and cleaning, the cost of repairs and supplies, and the character of the work to be done. The personal equation also enters into the question. The ability of the driver to operate and make the necessary repairs should be considered. A driver of poor ability means frequent and sometimes costly repairs. The automobile, while at present developed to an extent where a man of average intelligence can operate it, still requires some care, and neglect of such care is likely to be expensive.

Discussion.

Mr. Ganser—I shall only take up the motor cycle feature of this paper. We have a motor cycle with a box attachment for tools, meters and Welsbach supplies, which has been placed at the disposal of our trouble man. The cost of maintenance, during the month of March, was $11, including storage in garage, lubricating oil, repairs, etc. The results that we have obtained since adopting a motor cycle have been gratifying. It costs much less than maintaining a team, and our man is able to attend to the work in a much more satisfactory manner. At the same time it prevents our putting on a second man, the work for one man having just about lapped over. We probably have about 34 miles of mains and, as I said before, the results are exceedingly gratifying. We have signs on each side of the motor cycle, "The Gas Man," and on the front, "I am at your service for good service."

Mr. Bains—I am located in a suburban district, with about 100 miles of mains laid through a more or less hilly country. Before the advent of the motor cycle it was a very serious problem how to get around quickly. I installed one motor cycle about 3½ years ago, and 1 year later I installed another. One motor cycle, before it was played out, covered over 24,000 miles. My foreman used one motor cycle and my "hurry up" man the other. The latter man can reach the furthermost points in my district in less than ½ hour's time. I haven't a motor cycle with a box attachment, such as Mr. Ganser spoke of, but I am going to get one. In my district one man and a motor cycle took the place of two men and a horse and wagon.

Mr. Gillingham—We have 3 automobiles and 3 motor cycles, but have kept no record. One man is usually able to cover all mileage and able also to carry all his tools necessary. We are installing another motor cycle for our man in the residence district.

Mr. Frick—Mr. Gillingham, do you ever have any trouble with breakage of materials on these 3-wheeled motor cycles? I understand there has been a serious drawback to the efficiency of the motor cycle in the breaking of mantles, and Tungsten lamps, which are very fragile.

Mr. Gillingham—We have only been operating 6 or 8 weeks, and so far there has been no report of materials breaking. The machines are built especially for this class of work. The springs placed on the box are so fixed that they eliminate the jar in going over bad roads. We have good roads, which adds greatly, of course, to the efficiency of the motor cycle. Another thing we do is to keep down speed. The machines are geared so that it is impossible to go over 18 to 20 miles an hour.

On motion of Mr. Keppelman, a vote of thanks was given to Mr. Williams for his paper.

Report of Committee on President's Address.

The following report was handed in by the Committee on President's Address:

The Committee on President's address signifies its approval, and recommends to Council, the establishment of a Question Box with a competent Editor in charge. In reference to the adoption of a permanent emblem for the Association, we place the matter in the hands of Council, to procure an appropriate design and adopt the same. Your Committee recommends for the Reading meeting, a button of about 2½ or 3 inches in diameter, this button to contain a keystone, with the following words: "Penna. Gas Association, Reading, Pa., 1911," and also with each member's enrollment number. Above the

keystone, a gas arc, emblematic of the lighting business; on one side, a gas kitchen, emblematic of the cooking businss; on the other side, a blast gas appliance, emblematic of the industrial business.

[Signed.] W. R. Rhoades, C. W. Butterworth, H. H. Ganser, Chairman, } Committee.

The paper by Mr. C. R. Stull was as follows:

CONTROL OF UNIFORM CANDLE POWER.

This paper is based upon papers presented at various times during the past few years, the same being enlarged upon at certain points where experience in the line of work under consideration allowed this to be done. I wish to acknowledge the use of papers by Messrs. A. E. Forstall, Wm. H. Gartley and W. S. Blauvelt.

To thoroughly cover the subject I believe it necessary to start in on the first step in the manufacture of the gas; namely, the control of the retorts or generator sets. The proper or improper working of these pieces of apparatus is a decided determining factor on the quality of gas put into the commercial holder for distribution to consumers. In this respect, conditions vary with each individual case, and must be worked out by the man-on-the-job. No set rule can be formulated or laid down as regards the proper heat to be carried for the most efficient operation of the retorts or generators. High heats might be desirable on certain coals and oils, when, if carried on other kinds, would produce most disastrous results. It is the general result, however, that the gas experiences a greater drop in candle power when made under low heats. When the heats are higher we obtain a harder or better fixed gas, which can usually be transmitted to better advantage under both high and low pressure distribution.

The desirable contents in illuminating gas are the high tension vapors, chief among which is benzene. Along with this we have certain fixed gases, and in speaking of fixed gases I mean those which are stable at ordinary temperatures. A vapor at ordinary temperature exists as such below its critical temperature. A gas at ordinary temperature exists as such above its critical temperature. Right here it might be well to mark the meaning of critical temperature.

Practically all gases are susceptible to liquifaction. To accomplish this requires either reduction in temperature or increase in pressure, the critical temperature being that point registered on the thermometric scale below which it can be condensed into a liquid and above which it cannot be condensed into a liquid. Reference to tables will show that the first members of the paraffine series and ethylene have negative critical temperature, so that at ordinary temperature they exist as gases. From this we see that the term "hydrocarbon vapors," when applied to illuminants in general, is an incorrect one.

Returning again to the retort and generator house. The general composition of the illuminants in the gas depends, in the case of coal gas, on the composition of the coal carbonized and the enriching oil, if oil is used for enrichment. In the case of water gas it is dependent to a great extent on the oil used for carburetting. The illuminants which are conserved to the finished gas are now dependent on the heats to which this raw gas is subjected, and on the method of condensation. Oils containing more members of the paraffine and olefine series require different heats for proper fixing than oils with a benzine base. The more complex members of the paraffine series are broken down into the lower members which go to make up the illuminants.

In the case of water gas practice I believe the control of heats should be left partially to the judgment of the gas maker. It is a very common occurrence, particularly in a small works, to find conditions varying to a greater or less extent. For instance, the fire may be in such condition to-day that it turns out more blue gas per run than it did yesterday. Assuming the same length of run, then the carburetter and superheater heats can be higher, as the volume of gas, hence the speed of travel through the machine, is greater. If, on the contrary, the fire is not working as well, the heats could be lower, as the gas is in contact with the checkers longer and consequently has more chance to approximate the desired temperature. In speaking of high heats in the preceding paragraphs, I mean heats above average practice. We are to-day using higher heats, in coal gas practice, than were used several years ago. This has been the means of increased yields, a very desirable result. Along with these high heats, however, we have a "cracking process" of the hydrocarbons in the gas. By this process some valuable illuminants are formed, and also some undesirable constituents. This, I believe, is the point of formation of most of the naphthaline present, two benzene rings being broken into one naphthaline and one ethylene. Now, assuming that the gas has come up the scrubbers and condensers with the maximum amount of desirable gases and vapors present in it. Quoting from Mr. Forstall's paper on condensation: "Condensation is perfect only when the gas leaves the apparatus carrying such an amount of the most valuable hydrocarbons originally present in it, as it passes out of the retort, as will just fall short of saturating it at the minimum of temperature and maximum of pressure to which it will be subjected during its journey to the burner. The attainment of this perfection of condensation is rendered difficult by the fact that the various hydrocarbons have a solvent action upon each other, which makes it almost impossible to condense out the vapor of any of these, even though its boiling point be high and its vapor tension low, without at the same time bringing down more or less of these vapors with low boiling points and high tension, that, if diffused in the gas after the heavy vapors have been removed, would be retained under all conditions of temperature and pressure met with during distribution, while on the other hand the lighter vapors hold up at low temperature some of the heavy vapors, that but for this mutual action would be condensed out at high temperatures."

Keeping in mind the effect of this solvent action, we can readily understand why it is desirable to remove the condensate from intimate contact with the gas, at about the temperature at which it was deposited. One step in the attaiment of this result is gradual condensation. When a gas is "shocked" the condensate first forms as a mist, thereby allowing an intimate contact between the full body of gas and its condensate. This will cause a quicker readjustment of the vapor tension still valid, with the result that the condensate will carry down a quantity of desirable high tension vapors.

As the process of condensation is carried on the ratio of the high tension to low tension vapors is increasing, but the vapor tension of the composite mixture is gradually decreasing. This statement merely repeats the well known law that the pressure exerted by a mixture of a gas and vapor, or of two gases, is equal to the sum of the pressures which each would exert if it occupied the same space alone. A mixture of 50 per cent. benzene and 50 per cent. water would exert a pressure equal to the sum of the vapor pressure of the two separate substances at the temperature at which the observation is made. In the case of liquids which mix readily the pressure of the mixture is approximately the mean of the two individual pressures.

The ideal method of condensation would be one in which the base temperature was such that only the least trace of high tension vapors could stay in the condensate, while the outlet should be the minimum which the gas would reach at any point in the distribution system. In order to determine this minimnm temperature, recourse must be made to the hygrometer. This instrument will quite accurately show the minimum temperature to which the gas has been exposed, provided that between the minimum temperature point and the hygrometer that the gas has not come in contact with any other vapor condensate.

If at some point ahead of our photometrical testing room we can procure gas which has been chilled to a point equal to, or slightly lower than it will reach at any other point in the mains, and have the candle power at this point up to standard, we can feel reasonably certain that this candle power will carry to the burners. No further condensation assures no further loss in candle power. Continuing further along this line, the experimental work with the freezing coil and hygrometer the candle power necessary to be carried, in order to pass this point at a predetermined minimum, may be readily ascertained. With uniformity in retort and generator house practice this rule should hold for all cases at any individual plant.

Referring to benzol enrichment, when used with a view to making up variations in candle power, considerable might be said. Practice strongly supports the theory that in order to secure an enrichment the vapor tension of the enriching liquid must be above the tension of vapors already present in the gas. In our city this was forcibly demonstrated when we endeavored to enrich carbureted water gas with benzol. With a benzol of 78 per cent. quality we were unable to obtain any enrichment, in some cases it proved negative. This oil gave satisfactory results on low candle power coke oven gas, carrying satisfactory throughout both the low and high pressure districts. During the colder months the quality of benzol used was above 86 per cent., it being found that this was necessary in order to deliver a standard candle power.

Along with proper condensation better carrying properties could

be obtained if the gas were washed before enrichment with an oil capable of absorbing the low tension vapors, leaving only the high tension vapors present.

Mr. Blauvelt, in his paper on "Benzol Enrichment," describes a process whereby he washed the gas with an absorbing oil containing from 3 to 5 per cent. of benzol. This absorbing oil takes from the gas only the low vapor tension hydrocarbons.

For example, the gas before the washer contained 17.32 grains of naphthaline per 1,000 cubic feet, and after the washer contained but 3.55 grains. This was accomplished with but 0.14 candle power decrease and a loss of but 0.006 gallon of absorbing oil. While we did not employ a washer, a comparison of summer and winter enriching results strongly supported the practicability and advisability of this process. As regards the effect of main friction in the delivery of uniform candle power, I believe it can be neglected, assuming, of course, that the main is properly porportioned for the demands made on it.

During the past two years my own experience in this line has been almost entirely through benzol enrichment. This has been on varying ratios of water gas and coke oven gas, which, coupled with variable weather conditions, at times presented some peculiar problems. In the early spring we experienced a condition, for weeks at a time, when it is not necessary to introduce any enriching oil into the coke oven gas. This gas reaches our station at about 5-candle power, and will pick up light oils enough from the holder to enrich it to 17.5-candle power, above which it will not go, but will repeat the operation for quite a period of time. Of course, the reverse operation is experienced later in the year. This gas carries well on low pressure distribution, but not so well on high pressure, re-enrichment being necessary. By comparing the enriching values and drip oil tests in the appended table, it can easily be seen that the candle power was due almost wholly to condensable vapors:

Month.	Temperature—Air.	Temperature—Water Gas.	Candle Power—Coke Oven.	Candle Power—Fixed.	Candle Feet.	Darby. C. P.	Drop.
Feb.....	38	20.0	7.6	17.3	18,900	12.7	5.6
March..	38	20.2	8 1	16.9	18,900	15.2	1.7[1]
April...	50	19.0	7.0	16.8	34,100	16.1	0.7[2]
May....	61	20.1	8.0	16.8	52,500	16.1	0.7
June...	71	20.8	6.5	19.0	27,600	15.2	3.8[3]
July...	74	19.8	6.5	19.0	30,100	17 1	1.9

1. Less water gas than in February. Better grade light oil.
2. Less water gas than in March. Note increase in air temperature.
3. Excess water gas over coke oven.

High Pressure Drip Oil Test.

	February.	August.
Up to 202°.....	36.5 per cent.	0.6 per cent.
202°—212°.....	60.0 "	4.0 "
212°—260°.....	93.0 "	41.5 "
260°—302°.....	97.0 "	70.0 "

The heating values were as follows: Water gas, 619 B.T.U.; coke oven gas, 575 B.T.U.; mixed gas, 603 B.T.U.

VOTE OF THANKS.

On motion, a vote of thanks was extended to the Easton Gas and Electric Company, for the enjoyable and profitable meeting had, and attending courtesies by all members present.

On motion of Mr. Keppelman, seconded by Mr. Ganser, a salary of $150 was voted to the Secretary and Treasurer for the coming year.

On motion of Mr. Keppelman, the meeting was declared adjourned.

[OFFICIAL REPORT.]

SIXTH ANNUAL MEETING, ILLINOIS GAS ASSOCIATION.

HELD IN THE LA SALLE HOTEL, CHICAGO, MARCH 15 AND 16, 1910.

FIRST DAY.—MORNING SESSION.

The President called the meeting to order at 9:30 A.M. The first order on the programme was the

REPORT OF THE BOARD OF DIRECTORS,

which was read by Secretary Strohn, as follows:

The Board of Directors begs to report as follows: Three meetings have been held during the year, in addition to which considerable business has been disposed of by correspondence. This included the election of eight active and one associate members. Those elected were:

Active.

Doan, J. P., Gen. Supt., Jacksonville (Ills.) Railway and Light Company.

Hotchkiss, C. C., Asst. Chemist, Peoples Gas Light and Coke Company, Chicago.

Jenks, E. C., Manager, Charleston (Ills.) Illuminating Company.

Johnson, J. E., Gen. Supt., Danville (Ills.) Street Railway and Light Company.

McCollough, W. E., Sec.-Treas. and Mgr., Beardstown (Ills.) Electric Light and Power Company.

Mounts, W. L., Pres., Carlinville (Ills.) Utilities Company.

Reimers, F. W., Gen. Supt., Peoples Power Company, Rock Island.

Wallace, R. S., Gen. Mgr., Peoria (Ills.) Gas and Electric Company.

Associate.

Bestor, F. C., Mgr., Tar Products Dept., The Kettle River Company, Minneapolis, Minn.

At the meeting held May 5th, 1909, the resignations of Messrs. H. M. Harriman, G. E. Fish, J. R. Morris, C. E. Sharp and G. A. Myers were accepted.

As provided by the by-laws the Public Relations Committee was appointed, consisting of the following members:

Messrs. E. G. Schmidt, Vice President and Gen. Mgr., Peoria (Ills.) Gas and Electric Co.; H. J. Pepper, Gen. Supt., Urbana and Champaign (Ills.) Railway, Gas and Electric Co.; E. G. Cowdery, Vice-President, Peoples Gas Light and Coke Co., Chicago; H. L. Rice, Gen. Mgr., Western United Gas and Electric Co., Aurora; H. S. Whipple, Mgr., Rockford (Ills.) Gas Light and Coke Co.

At the same meeting a Technical Committee was appointed, the members of which are Messrs. Geo. F. Goodnow, Gen. Manager, North Shore Consolidated Gas Company, Waukegan; E. W. Eustace, Supt. Gas Department, Peoria Gas and Electric Company; R. B. Harper, Chemist, Peoples Gas Light and Coke Company, Chicago.

At a meeting, held January 13, 1910, arrangements were completed for the 6th annual meeting of this Association, at Hotel LaSalle, Chicago, March 15 and 16, 1910. Two committees were appointed: On Arrangements, Messrs. J. H. Eustace, E. G. Pratt, H. I. Lea, C. F. Asendorf. On Nominations, Messrs. G. F. Goodnow, J. H. Eustace and H. L. Rice.

At a meeting, held March 14, 1910, the Technical Committee reported that the following papers had been accepted for presentation at the meeting for March 15 and 16:

"A Few Do's and Don'ts for Small Coal Gas Works," by Mr. H. L. Rice.

"Calorific Value of Gas in Wisconsin Cities," by Mr. C. F. Burgess and Mr. W. J. Huddle.

"A Comparative Investigation of Oiling Methods, Oils and Diaphragms for Meters," by Messrs. R. B. Acker and C. C. Hotchkiss.

"Rates for Industrial Purposes," by Mr. S. E. Wolff.

"Comments on Certain High Pressure Gas Distribution Problems," by Mr. L. H. Johnson.

"Tar Macadam Roads," by Mr. F. E. Newberry.

"Tar Treatment of Roads," by Mr. T. P. Sharples.

The Public Relations Committee also reported the progress of their work during the year.

The following applications for membership were received and indorsed, and are now favorably recommended to the Association:

Active.

Argabrit, N. M., Belvidere.	Jacobsen, E., Chicago.
Baehr, W. A., Chicago.	Knapp, W. J., Chicago.
Booth, W. F., Chicago Heights.	Lawlor, J. W., Chicago.
Davis, R. N., Chicago.	McKeen, T. C., Belvidere.
Dawson, G., Springfield.	Slimpin, C. D., Du Quoin.
Graveley, R. C., La Grange.	Stillson, H. G., Joliet.
Hirsch, H. T., Chicago.	Thompson, I. T., Aurora.

Associate.

Steinmueller, E. W., Chicago.	Townsend, W., Chicago.

REPORTS OF THE SECRETARY AND TREASURER

showed, according to the books of the latter, a total receipt during the year of $1,612.53, an expenditure of $1,077.97 and a balance of $534.56.

The Auditing Committee reported that an examination of the accounts and vouchers proved the correctness of the general statement.

As Secretary Mr. Strohn reported the reception by him of letters carrying an expression of best wishes for a successful meeting from T. R. Beebe, Sec. Chicago Section, Illuminating Engineering Society; Louis Stotz, Sec. National Commercial Gas Asssciation; A. Cressy Morrison, Sec. International Acetylene Association; Preston S. Millar, Gen. Sec. Illuminating Engineering Society; Charles H. B

Chapin, Sec., the Empire State Gas and Electric Association; C. I. Vincent. Sec. and Treas. Iowa District Gas Association; George G. Ramsdell, Sec. Society of Gas Lighting: James Ferrier, Sec.-Treas. Southern Gas Association; W. G. Africa, Pres. New England Association of Gas Engineers; T. C. Jones, Sec.-Treas. Natural Gas Association of America; Glenn R. Chamberlain, Sec.-Treas. Michigan Gas Association.

ELECTION OF NEW MEMBERS.

The President announced that the next business in order was the election of new members, as per the list recommended by the Directors.

On motion of Mr. E. G. Pratt the Secretary was authorized to cast the ballot of the Association in favor of the election to membership of applicants named.

The Secretary subsequently reported that the instruction had been carried out and the President declared the applicants elected.

CHANGE IN ENTERTAINMENT PROGRAMME.

The President—We have changed the date of the banquet to the first instead of the second day of the sessions, so it will be held this evening. The Entertainment Committee engaged some performers, who have arranged for seven vaudevile acts. There won't be any speechmaking, but there will be enough entertainment to keep you all from being lonesome. I did not intend to present an address at this meeting, but as it was insisted I should say something I have prepared some remarks which I will now present.

PRESIDENT'S ADDRESS.

As President of your Association it is my privilege to welcome you to this, our sixth annual meeting, and that this Association has had a steady growth must be apparent to anyone who attended all of its meetings. This growth is due largely to the earnest efforts of the former officers and the co-operation of all the members. There are still a number of companies that have not become affiliated with the Association, but I feel sure it will be my pleasure to attend one of these meetings, in the near future, at which every gas company in the State will be represented.

As there have been no remarkable developments during the past year, and my knowledge of the practical end of the gas business is rather limited, I shall not take up much of your time in presenting my address, although I cannot refrain from giving a few words of advice to the younger men, and to those who are managing properties in the smaller cities, regarding their conduct when brought in contact with the public. They should always remember that a public service corporation is judged by the actions of its employees, and its standing in the community can be no higher than that of the men who represent it. In the past too many of us have failed to realize this, and we are in a great measure responsible for any unfavorable sentiment against gas companies.

It is gratifying to note that this sentiment is undergoing a gradual change for the better, due largely to the energetic efforts of those managers who realize that the gas business is not different from that of any other merchant who has a commodity to sell. Instead of assuming that the public must come to us, it is our duty to convince any prospective consumer that gas is a necessity, not a luxury, and after we have secured a customer we should always remember that he is entitled to the same treatment that you expect of the merchant with whom you deal.

If a consumer should complain about the service, don't try to convince him that you are infallible and that he has no cause for complaint. We are all liable to make mistakes, and even if you find on investigation that the party who complained was at fault, it did not cost you much to be courteous, and nine times out of ten you have gained a friend instead of making an enemy.

After 20 odd years' experience with public service corporations I have come to the conclusion that a great majority of the people are inclined to be fair, and my advice to young men, just starting in this business, is to observe the golden rule when dealing with your customers and refrain from making any promises that you cannot keep. By observing these simple rules, and furnishing a reasonably good service, you will find that the greater part of your customers will be "boosters" instead of "knockers." If the people you serve, and the business men of the community in which you are operating, are friendly, you need have no fear of the political agitators who are always ready to take advantage of complaints against a public service corporation to further their interests.

Thanks to the efforts of your Technical Committee, seven interesting and instructive papers will be presented at this meeting, and I trust that every member of this Association will take an active part in the proceedings, for frequently the best points in a paper are brought out during the discussion.

I wish to take this occasion to thank all of the officers and members of the regular and special committees who have done the real work in connection with this meeting, also to all members in attendance, as no convention can be a success unless the membership is well represented and everyone present takes an active interest in the work.

The President—The first paper on the programme is

A FEW DO'S AND DON TS FOR SMALL COAL GAS WORKS, by Mr. H. L. Rice.

[For the text of the Rice paper see JOURNAL April 23, p. 806.]

Discussion.

The President—As Mr. Rice's paper should be of interest to every manager or superintendent of a small gas plant in the State, I think some of the gentlemen have come prepared to discuss it. I wish every one present would take part in the discussion. You all know something about the gas business, and I am sure Mr. Rice will be glad and ready to answer any questions that you may ask him. Is Mr. Hartman in the room? I believe you were to lead the discussion.

Mr. W. E. Hartman—On reading this paper I was very much impressed with its value to the small gas plants, because it deals particularly with the details that are so important to the small plants. I can say in a general way that I agree with most of it. Most of the advice is good; some of it I think should be emphasized, particularly this on "Benches": "Don't vary size or length of charges on all your retorts to accommodate demand, thus injuring all the retorts, making napthaline and demoralizing your workmen. Run as many benches as your minimum sendout will allow, full and steady at maximum efficiency all the time, and taking up variations in output with a pick-up bench." I think that is very good advice, but it is not followed, as far as I have been able to observe, in many small gas plants. Many of them go on the plan of running all the benches when the demand is heavy, and when the demand for gas decreases they slack them all off, cut down the size of charges or lengthen that time on all the benches, all of which is demoralizing and results in poor gas, as Mr. Rice has clearly shown. Again, under "Hydraulic Main": "Don't tolerate the old-style tar and liquor offtake. A steady seal is too important." Now, the old-style offtake, as I understand it, is an offtake in which the tar and liquor have the same outlet; with such an arrangement it is absolutely impossible to keep a regular seal. As I tried to show in a paper two years ago before this Association, an offtake of that kind is actually a barbarism in a gas plant and should not be tolerated. The tar should discharge through one outlet and the liquor through another, entirely separate from the tar outlet. Under "Exhausters," Mr. Rice says: "Good, second-hand exhausters of the small size needed in these plants can often be picked up at a very moderate cost." Along this line I feel that a small plant with a minimum of skilled supervision is particularly in need of first-class apparatus, and second-hand apparatus is rarely first-class. Again, "The primary condensers can be kept out of doors." My experience with primary condensers, and it agrees also with the experience of many gas engineers, is that it is very difficult to maintain a regular temperature in a condenser out of doors, and I would consider it as not the best practice. Under "Purifiers": "Heat your gas up a little, say to 80°, for purifying." I would go even further than that. In fact, I would heat it to 90° or 100° to get the best purifying results and would not put a coil in the box. It is a disagreeable thing to have in the box, for it is in the way, is hard to repair and rusts very quickly. You can heat your gas by putting steam directly into the gas main before it enters the purifier to accomplish the purpose very easily. Now, "Keep the station meter locked and seal up the keyhole." I cannot refrain from saying that, in my opinion, you should have only men that you can trust and that you trust them. As to the retort house, "Don't be afraid to cut a few extra windows." I would say, entirely remove all the window sash in the retort house in the summer. Take the sash out of the frames, but put them back in the winter, if you wish. I believe that those represent all of the notes I made. Thank you. [Applause.]

The President—We would like to hear from Mr. Battin on this subject. I believe he has some views on it.

Mr. Battin—As Mr. Hartman said, there is little to be added to what Mr. Rice has written, but perhaps we can emphasize some points that

he has brought out. I want to suggest, however, a point as to refilling benches, and that is the use of the so-called silica brick. It isn't a true silica brick; they only call it by that name. That question should be given careful consideration. I think the life of the setting, together with the improved results, will warrant the increased cost, which is considerable; and in going deeper with the foundations, as suggested, I would also make the furnace as wide as possible, so as to get as large a fire as you can, in order to get the velocity of the gases through the fire low, thus keeping a more even heat through the benches. It also helps to keep down the clinker problem. I would suggest that a steam regulator be used on the pipe supplying the steam, and have a fixed orifice to the steam pipe, so that you may add or reduce the steam by putting on weights or taking them off. If we adopt the use of large charges, and burn them a little longer, and use the light seal, as suggested, we would probably approach the remarkable results brought up and discussed in the last meeting of the American Gas Institute. While I am not in favor of adding extra appliances in small works, the variation in make is so marked that I think the retort house governor is especially well adapted. In this connection I think you may perhaps have noticed an article in one of the recent journals as to the use of a fan exhauster. I would suggest trying a fan exhauster, but, instead of having a governor at the exhauster, to use the retort house governor and then keep the pressure on the main, from the exhauster back to the hydraulic, at about 2-inch vacuum. You will find in that way you keep an even seal and won't have to use a P. & A., because your fan exhauster will take the place of it. I don't believe in P. & A.'s or washers, for both of them throw a heavy pressure and are more or less of a trouble. As Mr. Hartman said, not only the weight of the charges, but also the time of the drawing and charging, should be kept constant; and here, as in the taking of the station meter statement, taking temperature, etc., I think this should be done to the minute. I do not believe in reading a meter at 7:15 that should have been read at 7 o'clock. As Mr. Hartman further said, I prefer to have the primary condenser in a building, not an expensive one; that is not necessary. In every small plant you have ever gone into you may have found them patching up old buildings or squeezing ill-designed apparatus into a building, as they don't want to throw the building out. There is no piece of apparatus in use in a gas works that cannot be operated in a light, steel-framed, galvanized iron covered building. When you have put up your flooring and your roof you can put in your apparatus, and when you see where you want your windows and doors, then you can put up your siding. In addition to the recording gauges, I would suggest a couple of recording thermometers, one on the exhauster and one on the scrubber. It will be well to get them with the long extension, because then they can be used for extension work. No matter where you have to tap in, the little extension will enable you to use the gauge wherever it is handy to put it up. Mr. Rice spoke of making your own scrubbers, but I don't believe in home-made stuff. I think, generally speaking, you will get more for your money by going outside and buying from well established manufacturers. There are so many details, in the design even of a scrubber, that I think it will pay you to go to the manufacturer. Another thing, the advice and information you get from talking it over with them while you are installing the apparatus will more than repay you for the extra cost. One thing in Mr. Rice's paper we cannot consider too much, and that is not to use heavy cast iron pipe and fittings. There is certainly no use in putting in great, big connections in a works, so that when you get a valve open ¼ of the way you find, no matter how much farther you open it, you cannot get any more gas through; in other words, for example, that your lines on the street are so long in proportion to their size that the friction through the pipe is sufficient to cut down the flow of gas, so that the drop in pressure caused by the amount passing through the connection in the works is very small. As I say, it is a thing to be well considered whether we cannot use smaller pipes and connections in the works and smaller valves. I think that, while we ought to use the ordinary steam pipes and fittings and valves, they should be flanged, not screwed. I wish we could dismiss the candle power phantom as easily as Mr. Rice has suggested, by simply adopting the calorimeter; but I think what he did to the old jet photometer will hold it for a while.

The President—Is Mr. Blossey in the room?

Mr. Blossey—I am surprised and disappointed in finding myself alone in my viewpoint of Mr. Rice's paper. These other gentlemen appear to take it that the operation of a gas works is strictly mechanical; others would have it pure chemistry. To me it is mathematics, a personal equation. Mechanics, chemistry, physics—these are but the scratch pad and pencils for working out the human problem. Look again at Mr. Rice's paper. We gather that what we want is not more machinery, nor better; not more men, nor better; but more personal influence, with the attendant better results. We are not advised to pit man against man, but rather to balance our equation. Mr. Rice makes it very plain that a negligent night foreman is a creation of the indifferent personal interest on the part of the superintendent. That the average foreman is a fair model of the manager who governs his department. You see, gentlemen, we are, by favor, responsible beings. "So-the-father so-the-son" is applicable to us as gas men; for our help is after all a part of our business self. Do we furnish brain and brawn enough to give the proper impetus to each department; then we must have a receptive vessel on the other side of the equation. That is, we should not be, as might at first be gathered from Mr. Rice's statement, the whole "Brain and Brawn" of the works, but rather the incentive for doing things right all the time. When you came to Chicago did you leave that postal card on your desk with this apt witticism on it: "If anything breaks while we're away fix it yourselves." Did you mean it? Does your foreman know how to manipulate a center seal? Does he know at which end of the main to begin to look for back pressure? Are you in constant anticipation of a message from your works? How about the personal equation on your plant?

The President—Mr. Whipple, may we have a few words from you on this subject?

Mr. Whipple—I agree with the last speaker quite emphatically. I think this paper, which Mr. Rice calls an elementary one, is a most excellent paper. It should be in the hands of every work's foreman, whether it is the foreman of a small or large plant. I think it would do him good. And after reading it, I am very sure it would do me good. I also think if Mr. Rice could be induced to write another paper on water gas plant, we might induce the Gas Institute to bind the two and hand them out to all those who graduate from Gas Institute classes. I offer that as a suggestion to Mr. Rice next year. I know he is quite a busy man, but the busy men are those from whom we get the papers. I would like to ask him where he would put the recording gauge on the inlet to the exhauster; right close to the exhauster, or over in the retort house? I have seen them both places. I knew a gas plant several years ago that was troubled with back pressure. On being asked about it and I inquired as to their pressures, I was told they did not have a pressure gauge in the city; so I couldn't help them very much. I consider the P. & A. tar extractor has its use, but I know one that is in a plant not a year old, where, this winter, they ran the plant with the temperature down to 55° or 60°, and I have my doubts whether that was doing very much work. I am not sure I agree with Mr. Rice over putting steam in the oxide, or into the gas to heat it, because you are liable to get the oxide wet, which harms it, when you want to revive it. I would recommend that you put covering on all of the steam pipes so that you would save your heat, and I think it is an excellent thing to have the foreman go through the plant and look at everything in it every morning, just after he looks over his night foreman's report. I would have him keep the mouthpieces clean, also the standpipe and the yards, for a shiftless looking yard makes the men shiftless.

The President—Let us hear from someone else. Won't someone say something more on this paper?

Mr. Negley—I would like to ask Mr. Rice a few questions on some of his suggestions. One concerns the filler for the scrubber. He speaks of 6-inch boards, an inch apart, and bound in convenient bundles. Are those bundles placed on the trays in the manholes, or does he remove the trays and put in one long bundle of boards, extending the whole length of the scrubber, or are they placed crosswise; or just how does he manage that? Another point that has been brought out regarding the foreman for gas works. We have had a great deal of difficulty in securing a man, who is familiar with all parts of a small gas plant, for foreman. A couple of years ago, being in need of a foreman, I went to several of the larger works, and found a man who was a good stoker all right, but he didn't know anything about the purifiers, or exhauster, or anything of that kind. It is a very hard matter to get a man whom you can send into a small works and have him run it. You pretty near have to bring him up, or make a foreman out of one of your stokers. As to heating the gas before it is purified, my experience thereon has not been very extensive, but we did find that it was a hard matter for us to purify the gas when it was too hot, and I would like to ask what temperature the gas should be when it goes through the purifiers? And as to putting in steam, I wonder whether any deterioration of

the illuminants in the gas comes about by turning the live steam into it, or whether it is a better plan to heat it by the steam pipes, as another man suggested?

The President—Anyone else? Remember everybody is at liberty to state his views. It is one family, and we would like to hear from all of its members. I wonder if Mr. Russell would tell us anything about bench construction or design?

Mr. D. R. Russell—It seems to me that the matter of bench construction and design has been pretty well hashed over at these meetings, and that the members who heard the discussions and read the papers are pretty well posted thereon. I don't think very much of this so-called silica. As a matter of fact, if we put the so-called silica in the test kiln we find it doesn't amount to much. If you use pure silica, properly made, and in the proper form—that is, in blocks—you will find great advantages in it. Of course, it is expensive, but it is well worth the price. Silica can be made in moderate sized blocks, practically in the shape of the ordinary settings, and it certainly will lengthen the life of your bench, and be worth several times the extra cost of the material. One point, however, I would like to make was commented on at the meeting last fall of the Michigan Association, and it is in regard to the masons sent out. You will find that in many works, especially in small ones, that the manager or superintendent expects to find that the mason sent out is a gas engineer. He expects to have him tell him how to run his plant and his benches; in fact, how to do everything. Another point. Most masons, the best of them especially, will, at times, get to drinking. Now, instead of notifying the manufacturer that the man is not behaving himself, or doing good work, they don't report it at all until after the job is completed. Then they come around with a complaint, especially if anything goes wrong afterward. I don't think that a company when it makes a contract with a manufacturer of any kind—I am speaking not only of bench manufacturers, but of any kind of apparatus—entirely relieves itself of all responsibility. I think that anybody who is having benches or any other apparatus installed should have a careful supervision of the work and a very close inspection. If they find that a man is careless, incompetent or intoxicated, the manufacturer should be notified at once. It isn't fair to the gas company, or to the manufacturer to permit that man to go ahead, or that kind of thing to go on. If masons were financiers they wouldn't remain masons long, or stay in any other sort of mechanics, and you cannot expect to get a man of that class who is entirely without fault, no matter how carefully you pick him out. I would advise all companies having work done of any description to keep a close inspection to see that their work was being properly done, and if they feel that it is not, it is only fair that they should at once report, having the thing rectified there and then, without waiting until afterward to complain about the work having been improperly done. That is a very important point, and think it is the duty, as I said before, that such close inspection should be had by the company purchasing the apparatus.

The President—Is there any manager here who runs a works as small as not to afford an exhauster, or anyone else who would like to be heard. I am afraid they have all been so prosperous that they have all been able to buy exhausters. Is Mr. Newberry here? I understand he has an outside condenser. We would like to hear from Mr. Newberry, of Kankakee.

Mr. Newberry—I might state in this connection we have an outside condenser, and I note from the remarks made by Mr. Hartman that he does not approve of condensers set out-of-doors. We have a condenser that was placed last summer, and owing to lack of proper space to properly house the same, we were compelled to place it out-of-doors or in the weather. The condenser has been in active operation since early summer and is in operation at the present time. It is so constructed that during the warm weather we regulate the temperatures of our gas through the manipulation of two large manhole plates in the bottom of the same. These manhole plates during the extreme warm weather are left entirely open, allowing a circulation of air to pass up and through the 3-inch flues of the condenser proper. During the fall, when the temperature at night was quite a bit lower than during the daytime, these manhole plates were partially or entirely closed, owing to weather conditions as to heat and cold or the desired temperature that the foreman had to maintain. During the month of November it became evident that we could not successfully operate this condenser out-of-doors without supplying the same with some means of artificial heat. At the time the condenser was constructed it was specified that there was to be a 2-inch opening in the bottom of the air chamber in addition to the 2 manhole plates; also, at the top of the condenser there was to be a 2-inch opening. We experimented some time to get the proper regulation on a steam jet within the air chamber to give us the desired results. On our first trial the manholes were entirely closed. After the manholes were closed we filled, what was the air chamber, with water, and into this cold water cracked a ¾-inch steam valve. We had considerable difficulty operating under these conditions. I found that putting the steam into the air chamber which had been filled with water had a tendency to rock the condenser on its foundation, and I was much afraid that the connection, both as to inlet and outlet, would be broken. I, therefore, decided to remove the water and inserted a piece of 2-inch pipe, capped at one end, and the entire surface of this pipe was perforated with small holes. The object of this was to do away with the vibration or knocking when the steam was turned into the air chamber or water. We found that by using a pipe of this sort we entirely eliminated the knocking or vibration, and the condenser was able to rest on its foundation without disturbance by means of the ¾-inch steam line into this perforated pipe, which was submerged in water. We were able at all times during the extreme cold weather to regulate our temperatures exactly where wanted. By means of the 2-inch outlet at the top of the condenser we connected up with a short 2-inch nipple and a reducing coupling 2 inches by 1¼ inches, and extended from this opening directly down a 1¼-inch overflow line. This line was led directly to our tar well where it would discharge what surplus water was made by means of the steam into the condenser. I might further state that we had no trouble of any kind with our condenser during the extreme cold weather, we being able at all times to regulate our temperature, so I cannot see why an outside condenser, where conditions demand such a setting, is not all right.

The President—I believe Mr. Eustace is operating an outside condenser. We would be glad to hear from him.

Mr. E. W. Eustace—We do not have any trouble in keeping our temperature up on account of the large volume of gas. We do not use any water at all on our primary condenser during the extreme cold weather. Our volume is running from 800,000 to 900,000 feet a day. The temperature of the primary condenser never gets lower than from 100° to 110°. We use water on our secondary condenser inside of condensing room and regulate our temperatures there.

Mr. Barnes—If you will permit just a word in connection with what Mr. Russell said. The thought came to me in the discussion of this paper as to how far behind we are in this country, in comparison with Europe, in the production of gas, especially as regards verticals. It is a well-known fact that we excel the world in almost every other line of industry, but it is just as well known that we lag behind when it comes to gas manufacture. The point I wish to make is, that many of the most eminent gas engineers in the United States agree with us that the coming line to be worked along in the perfecting of the modern gas plant is in the utilization of silica material. Some engineers in the United States may agree with Mr. Russell that it is not. Again, there is the question of vertical retorts; another thing that is absolutely an experiment in this country. I believe that any of the gas bench manufacturers of this country (we stand in that position, and I know that Mr. Russell does) would be only too glad to co-operate with the larger gas companies to work out these problems. We cannot ask the smaller companies to do this. It would be a losing proposition for them, for they already have their hands full to obtain results along the lines upon which they are now working. But I had in mind the plants of a little larger capacity, say those making over 500,000 feet a day. If these people would co-operate with the bench manufacturers in these matters, the results would be of mutual and lasting benefit. It would not be a paying proposition for us from a pecuniary standpoint, but, as I say, we would be only too glad to make any reasonable terms to conduct these experiments. I believe that the problem of more economical gas manufacture in this country would be greatly simplified if more of our larger gas companies would take a broader-minded view of this subject, not to look ahead for 1 or 2 or 3 years only and try alone to get the best results with what they have—I think the benches of to-day are just about perfection, so far as we have gone in present practice—but to look ahead 10 or 20 or 50 years, for I believe that 50 years from to day will see the gas business just as far advanced from what it is now as the present state of the business is from what it was 50 years ago. So I simply suggest that this subject be seriously considered by more of the larger gas companies, and that they pursue a broader-minded policy along this line, looking to the ultimate gain rather than to the temporary disadvantage.

Mr. D. R. Russell—As to the remarks of Mr. Barnes, I agree with him that the manufacture of coal gas in the United Sta tes is in many ways behind the practice in Europe. Possibly Mr. Ba rnes misunderstood my remarks or I have misunderstood his. I do advocate the use of silica if made pure and in the proper manner, but I do think that in much of this benchwork so-called silica in reality is not silica. It has had a large amount of silica adde d to the clay binder, which, in my opinion, does not increase the melting point of the material to any great extent. For some purposes, such as coke ovens, it is valuable. Leaving out the question of vertical retorts or chamber ovens, but going back to the bench, as it stands, I think the bench built by the American designer, or the American built bench, is far ahead of the benches of the design constructed either in Germany or in England. While it is true, in Europe, that they have in the past secured longer life from their benches than in America, they have not gotten the fuel results as low as they have in America, and when you hear of retorts over there lasting 2,000 days it is not surprising, because they run such low heats. There are records of retorts in America running approximately 2,000 days. Of course, that is very unusual, but these retorts have been run under high heat, and if run on the heats that are usually used abroad they would probably have lasted 3,000 days. So that, so far as the bench design and construction, and even materials, are concerned, which are used by the best manufacturers of the United States, in my opinion they are equal to the best; that is, the best makes here are equal to the best makes over there, and the designs of the bench, as a rule, are better.

Mr. A. S. B. Little—I would like to agree with what Mr. Russell just said about American benches. For their purpose, they are far-and-away superior to the foreign benches; that is, comparing them with our ½ and ¾ depth benches. They are getting much better results in yield per foot of retort, per square foot of retort house floor and per mouthpiece, than in any small benches that I know of. And when you come to the bigger benches, there isn't much to choose between them. As to silica material, a lot has been said about it, but I think the gas men haven't been given any idea of the cost. I think Mr. Battin said the cost would be prohibitive. That is not so. Take a ½ depth or ¾ depth bench, and the silica material would only amount to about $40 additional to the cost of the bench, and I am sure it would add to the life of the retort and let you run with less heat in combustion chamber and still get at least the same heat inside of the retort, owing to the better conductivity of the silica material; but it must be good silica, not so-called silica. It must be at least 98 per cent. pure, and the rest of the mix be just the bonding material, which is usually lime.

The President—Do you mean to say that the best silica would only increase the cost of the bench about $40.

Mr. Little—Yes, sir; that is an absolute figure. I know, and I will stand by that all the time, if anybody wants it.

The President—Have you any suggestions to offer as to how the present bench could be improved? Of course, the bench manufacturers don't think they could be improved.

Mr. Little—The only way in which I think they could be improved is by using silica in the setting of the walls. As to this paper, it is one of the best ever presented to this Association, and I think it should be extracted—certain parts taken out—and what is proper for foremen should be written out on a card and given to the men, not hung up in the works—for we already have too much there—to let the men read it thoroughly, and if they will work along that line, they will have very much better works than at the present time. A remark was made about the fan exhauster down in Alabama. I was really surprised at the results they were getting, and I think it will be important for all of you to look into it. They use a governor in connection with it, and I think that is the only trouble that they have had with it. They run the governor too close to the fan. If they would put the governor as close to the hydraulic main as they now have it to the fan, they would get better results; but, even with the governor so close to the fan, the results are really surprising. The only trouble which they were having was, I think, the gas arrived at the governor too cool, and it, therefore, acted as a tar extractor, and they have had some little trouble with naphthaline. I have seen similar trouble elsewhere, entirely due to the distance of the governor from the hydraulic main. One other reference in regard to the steam supply pipe having a fixed orifice, and changing the pressure by means of weights. I read in a paper some years ago something on that subject, written by some man in France, who adopted the principle of using a cap pierced with a certain size of hole, to let the steam through, and once he found the exact amount of steam that he wanted he never let that cap be changed. Therefore, there could be no variation of the steam. I think that is a very important thing, knowing exactly the amount of steam that you are putting into any parts, especially into the furnace. I thank you.

Mr. Russell—I don't want to take up the time of this Association, but I think Mr. Little's remark about the benches is somewhat misleading. It is easy enough, gentlemen, to lose money. I guess we have all had experiences of that kind, but it is pretty hard to make money. A manufacturer could not build, setting tiles of fairly good silica for a half-depth bench, speaking now of the furnace arch and settings around the retorts, if made in the shape of tiles, for $40 a bench, unless he was going to lose money. Then, again, Mr. Little does not explain. He says a "bench." Now, a bench may possibly contain 6 or 9 or 12 or 18 retorts, and it would depend in my mind a great deal upon the kind of bench you were building, whether a single bench with a few number of retorts, or a larger through bench with more retorts, what that would cost to build. A few years ago there was practically no silica made in the West. To-day some very excellent silica is made by several of the manufacturers. If, however, you were going to use Eastern silica, you would have to, of course, pay the freight, which would run it up very much higher than Mr. Little suggests. I think anyone figuring on using silica must add something to the cost which Mr. Little suggests, if the manufacturer wants to make any money; and that is what he desires to do.

Mr. Little—I think Mr. Russell shows very plainly where the difference comes. He said they wanted to use silica tiles, in the setting of the walls, whereas I spoke of brick. I quite agree with him that very few manufacturers will bid on silica tiles; but, as you know, I am a builder of silica brick settings. It would cost me about $20 to build them, and I would have to charge you $40 so as to make a profit. Mr. Russell spoke of the quality. You will remember I said it would have to be 98 per cent. silica. I have reference to some of the best silica. There is the Harbison-Walker, the American, Refractories and the James Gardner, Jr. They are all about equal. They are all from the East. As to the size of bench, I spoke of a ½ depth bench. Now if you put in 9 retorts, you will use less silica. Therefore, the price would hold good, whether it is a setting of "eight," or a "seven," or a "six," or a "five," or a "four," or a "three," or a "two," or a "one," the price would be just about the same.

The President—Is there anyone else in the room who would like to share in this discussion? Mr. Russell said it would be hard to make money, and most of us found it hard to save it, as well as to make it. Mr. Rice, would you like to answer some of these suggestions that have been brought out here in the discussion?

Mr. Rice—The discussion has taken such a wide range that it may be difficult to answer all these suggestions; but I will do my best. With Mr. Hartman's remarks on second-hand apparatus I quite agree, and it was not my intention in the paper to urge the use of second-hand apparatus; but what I have endeavored to bring out all through the paper, in speaking simply of the small coal gas works, is the idea of effecting all possible improvement at the minimum of cost. I personally know how difficult it is for many of these small works to get money for improvements, and wherever they can save money, and yet get what will do the work—that is what the managers want to aim at. Our larger works have grown in many cases so rapidly that they have grown away from apparatus before the life of the apparatus had even begun to be used up, and that is where the small works have the advantage. They step in and pick up a second-hand machine that has many years of useful life left in it; and that is very true of exhausters. A large number of No. 3 exhausters which will suit the works that this paper covers, can be bought at a fair figure and which will do good work for a number of years. That is the idea I had in mind in advocating second-hand apparatus. The question of the primary condenser being out-of-doors seems to have been covered by two other speakers. I agree with Mr. Hartman that it is a very good thing to have all of your condensers and all of your machinery covered, but there the same idea of economy prevails where the manager of the small works wants to make improvements and has a limited amount of money. He can put his condenser out-of-doors, and if he will simply arrange for the range from cold water to hot water, with air between, he will have a very even temperature. I happen to be familiar with Mr. Newberry's experience at Kankakee, and know that the condensers during the hot weather of last summer and the extreme cold weather of this winter have given satisfactory results, and that they have had no trouble in getting an even temperature, by introducing hot or cold water as required. The ques-

tion of introducing steam into the gas, or heating by coils in the box, or having the purifying house warm, simply seems to be a question of the moisture in the oxide. I think you will all recall the discussion before the American Gas Light Association of Mr. Forstall's paper on dry heat for purifying, which was hailed as a great advance on the subject. There is no question but that in many works putting steam into the gas makes the oxide too wet. I think that is very much the case where water gas is made, and I am wondering if, in Mr. Whipple's case, he isn't making a considerable percentage of water gas. If so, I am inclined to think much steam introduced into that gas would cause the trouble he suggests, and that dry heat would be better. Mr. Hartman says, in reference to sealing up the keyhole of the meter, that he would prefer to have men he could trust. Now I didn't mean that statement in exactly that way, although partially so. What I believe in is in having everything in a gas works so thoroughly checked that there cannot be any possible question, and that the small gas works needs this constant check more than any other, because the manager can only come into the works once a day, must look around quickly, see what he has to see and get away and attend to his other duties. There is no superintendent always on duty. There is a foreman, and I yield to no one in appreciation of the honesty and ability of the many good foremen in our small works, but unfortunately these trained men are getting fewer, and furthermore, the night shift in all small works is dependent on what is generally called a head stoker. Now I see no reason for putting the temptation of the manipulation of the results in the hands of any man when a simple check can be kept that will be absolute. We have in our offices and in every business cashiers handling money. We believe absolutely in their honesty, yet we do not allow them to proceed in their work without surrounding them with all the checks that we deem necessary, not only for our own protection but for theirs. I believe that in a gas works these checks will protect one man as against another. I have seen in my experience one smart, unscrupulous foreman put it all over an honest but less shrewd man by manipulating the results in one shift as against the other. Mr. Battin brings out the use of steam under benches, and it seems to me that that is a very good point. You will recall the paper before the Institute last year on the Worcester (Mass.) plant. It was stated that the results of steam put under the benches had proved about as satisfactory as returning the flue gas, and many reports are at hand now, showing most astoundingly good results by the use of steam introduced into the ashpan water. It is necessary to regulate the amount of steam, as Mr. Battin suggests, and one very good way of doing this is to use a reducing valve with a constant steam pressure back of an orifice. The steam would be blown, for best results, directly into the water of the ashpan, not under the bench. Certain companies using this method are now reporting that they are cleaning their benches only once a week, and the same practice is used in outside producers with very good results. I believe with Mr. Battin that lengthening the charges and using larger charges are worthy of extended trial. In other words, that we ought all to fix a very careful eye on the Worcester results with their 7 and 8-hour charges. I believe with him in the use of recording thermometers, and think all of these devices, as I have suggested before, all of these checks that you can put in the small gas works to make the results absolute, are good. Again, in regard to his remarks about going to the recognized builders of gas works apparatus, instead of using a home design made in a local shop. There, again, I had in mind only the difficulty that many small works have to get their presidents and owners to allow them to even get bids on apparatus. It seems to me in many cases they could make up a simple design of some condenser or scrubber that they needed, and could frequently get a local shop to bid on it where they could not otherwise interest their owners in the construction of that apparatus. I also wanted to bring out the fact that a condenser for a small gas works, designed with the right number of 3 or 4-inch tubes, and a scrubber with home-made trays, is not necessarily an expensive piece of apparatus. Mr. Whipple asked where I would attach the recording gauge on the inlet side of the exhauster. It seems to me it should be attached some distance from the exhauster, and if the exhauster is governed by a pipe direct from the hydraulic main I would attach it to that pipe so as to show the exact vacuum on the hydraulic main. In answer to Mr. Negley's request for a description of the scrubber trays, I imagine he has not quite gotten the idea of these trays. They are simply bundles of wood on end joined together, with 1-inch spacing pieces between. Simply, bundles of 6-inch boards, on end, cut the right length to fit the circle of the scrubber. The lower layer is placed on the angle iron rest, the next one no top, crosswise, then another one crosswise, and so on, very much as you build up the checkerbrick in a water gas machine. This can be made easily and cheaply, and do excellent work. I was rather surprised that there was not more comment on the paragraph on bench construction, as to the obtaining of designs satisfactory for the particular arch to be filled. However, Mr. Russell brings out the question of closely inspecting the work that is done, and that is certainly a very good point. I have in mind one case where 2 benches were built in a small works, and, in order to obtain a deeper furnace, the builder, or perhaps it was his mason, brought up his top retorts so close to the top of the arch that the life of the 2 benches was less than a year. Now it seems impossible that that could have been permitted, but there was probably no inspection of the work. Furthermore, there could not have been any previous design submitted for that work for that particular arch, and in looking it up I found that was the case. It was simply a case where a manufacturer submitted a stock plan, without regard to the size of the arch which he had to fill, then his mason, putting it in as he thought would best suit the space that he had, carried a disastrous result. I was very glad to hear Mr. Russell's defense of our American material, and he is certainly correct in stating that there are many instances of remarkably long life, even under the heats carried in our American works. I have personal knowledge of retorts that have run 1,500 days under extremely high heats, and this brings out also the advantage of steady running, because in this works the result is attributable not only to the good quality of the material, but to the fact that the retorts were run steadily at all times, and also carefully supervised. Mr. Little's remarks on the fan exhauster (and I believe one other speaker mentioned it in connection with the hydraulic main governor) I believe well worth attention, and it is extremely probable that a P. & A. can be thus dispensed with. Of course, I appreciate the wide difference of opinion on the question of P. & A.'s, but believe, in general in our small works, they are a good thing. I cannot agree with one speaker who attributed to them a large amount of back pressure, as they should not be run with over 1-inch differential. But where a great many mistakes are made with the P. & A. is in getting the temperature too low, and, as I have stated in this paper, it should be at least 115° at the inlet of the P. & A. There has been nothing said by the speakers in regard to the necessity of testing both the holder and the works gas. I might explain in regard to this that my attention was called to one works where they had used all the various checks and checking methods on the men to insure good and accurate results, only to find that their gas was not satisfactory. Upon putting into use the calorimeter which they bought at that time, the test of the gas showed that what was being made in the day time was eminently satisfactory, running from 600 to 620 B.T.U. However, they made a test of the holder gas, and found the result very much lower, as low in fact as 520 B.T.U. This occurred day-after-day. It was then perfectly evident what was occurring, the night-shift was laying down and taking aid to make up, so the simple remedy was applied of telling the foreman that he would have to produce each day, at the time of testing the works gas, holder gas of over 600. The experience at that plant has been for the past 6 months very satisfactory, and they have had splendid results, both the works gas and the holder gas testing over 600. I think that is a justification for the statement in the paper that you cannot afford not to have a calorimeter; that you cannot fool a calorimeter or get away from it. This experience also has a bearing on the question already discussed of locking up the station meter and putting on all these various checks. The foreman in this works was an intelligent French-Canadian, very shrewd. He has been in the works a good many years, but I don't think that he ever made very good gas. However, the plant came under new management, and the question came up, "Shall we throw this man out." The management looked him over and found he had good qualities. He was simply too smart. Now they could have thrown that man out and possibly gotten a better one or perhaps a worse one; but the fact is, by putting on these various safeguards and telltales, careful daily inspection and this final calorimeter testing, this man has turned out to be a first-class man in every respect. Having learned that he has to do the work, he does it, and I happen to know from the management of this plant that they feel no lack of confidence in him at the present time. So there is a case where the calorimeter and other checks not only made a good works but a good man.

On motion of Mr. Pratt a vote of thanks was tenered to Mr. Rice for his thoroughly practical and useful paper.

The President introduced Mr. W. J. Huddle, who read the paper jointly prepared by him and Mr. C. F. Burgess, on the

CALORIFIC VALUE OF GAS IN WISCONSIN CITIES.

[For the text of the Huddle-Burgess paper, see JOURNAL, May 2, page 846.]

Discussion.

The President—I realize this is a subject with which we are not familiar, and if anyone in the room can discuss it we will be glad to hear from him.

Mr. G. Allison—I feel very much interested in the paper for the reason that Professor Burgess and Mr. Huddle are from Wisconsin, and our plant has adopted a calorimeter. We do not consider it a serious burden to have a calorimeter. It is not a serious burden for any plant, and it isn't so very expensive. The calorimeter enables us to have an absolute check on our works, also on the holder gas, in line with what Mr. Rice has mentioned, and also a check on the foremen. We have also noticed that the visits from the Wisconsin Commission's men have not been quite so frequent since we have had the calorimeter; but I didn't know the reason until just now.

The President—How frequently do you test your gas, Mr. Allison?

Mr. G. Allison—Once or twice a day, and if there is anything wrong, or it does not come up to standard, we test it very frequently during the day until it does come up to standard. We haven't had any difficulty in keeping above standard; in fact, we were above standard when we put in the calorimeter. I want to say in reference to the Commission, they have not passed any rules or regulations that we could not meet, and we think they have been very fair. We are very fortunate in having a Commission in Wisconsin, which I think has helped a good many of the smaller plants to get their gas up to the proper standard. I think the Commission has been a benefit to every plant in the State.

The President—What candle power requirement is there in Wisconsin?

Mr. Huddle—No candle power requirement.

The President—Has any other member here had experience in testing gas? Is Mr. Steinwedell in the room?

Mr. Steinwedell—The adoption of a heating value standard for manufactured gas in Wisconsin, with no reference to candle power, was a decided step in advance and has brought forth some interesting data. The averages of the results tabulated are as follows:

COAL GAS.

Highest average heat value in any one plant.	666 B.T.U.
Lowest " " " " " .	549 B.T.U.
Average heat value in all plants.	619 B.T.U.

WATER GAS.

Highest average heat value in any one plant.	673 B.T.U.
Lowest " " " " " .	515 B.T.U.
Average heat value in all plants.	623 B.T.U.

Heat is what the gas company principally has to sell and is what is used in almost all the plants in which gas is now used. The only place that candle power is of importance is in the flat flame burner, and where the Wisconsin regulations are observed the candle power cannot well be below 15 to 16, which is sufficient for flat flames, which are mostly used where bright light is unnecessary. All mantle lights, stoves and other heating appliances have to be adjusted according to the heat value of the gas, and the great majority of the gas is used in appliances of this kind. If the heat value is constant the candle power is sure to be fairly uniform, while if the candle power is maintained uniform, the heating value will vary considerably, depending on the quality of materials, methods of manufacture, weather, etc. The ruling of the Commission concerning the heating value of gas is most fitting and just, and also insures the public the best of service.

Mr. Goodnow—I think it is gratifying to see these reports dated back several years, to August, 1908, when there could have been no especial preparation for observing the regulations of the Commission, which seems to point to the fact that the gas as a rule was averaging well, and if the Wisconsin Companies were averaging as well as this, there is no reason to believe that Illinois isn't averaging just as well, and other States the same way. It seems fair to think that if the Wisconsin Commission has found their requirements are being practically met without any great change in the methods of manufacturing gas, that we can assume that Illinois is doing fairly well; also, other States which have no Commission, and the averages which Mr. Steinwedell has prepared from this data seem to show that fact. Professor Burgess and Mr. Huddle have brought up the question of heat units in the gas in the paper just read, but we, of course, understand and know that many other requirements are inspected by the staff, and we would like to have a little description of those, which I have no doubt he can give us, as to whether or not the sulphur content is noted, and what it is, the ammonia allowed and how much—whether, I mean, it is inspected—also the matter of other requirements, I am sure will be of interest to all. Perhaps a good many of us have read of the requirements of the Commission as to gas, but I think that these things are of interest to us, and especially the matter of meter testing, the requirements of the Commission of minimum and maximum sources of error above and below absolute correctness, and a few points like that. I would be glad to hear from Mr. Huddle on those points.

Mr. Huddle—I think that I can answer most of these questions, as I have been in close touch with the work for the past two years. The gentleman spoke of visiting the plants more frequently that did not have a calorimeter than plants which did have a calorimeter. I would like to explain that our plan of inspection in Wisconsin contemplates in every case the use of all the companies' records. We do not aim to do any work that can be done by the company, more than to assure ourselves that the work done by the company is correctly done. We check up their equipment. We do not plan to take many heat values. Our inspector goes in, looks over their records, takes a few heat values, checks up their records and sees that everything is all right. But not much work actually is done. The same way with the meter testing. We only test enough to assure ourselves that the practices of the company in regard to the manner of testing are good, and we calibrate all the meter provers. As to the requirements of the Commission, in regard to the purity of the gas and the testing of the meters, the rule says that there shall not be more than a trace of sulphur, as H_2S, and not more than 30 grains total sulphur. There is no ammonia requirement and no tests are made; the tests made are for total sulphur, for H_2S, and these show that the conditions are good and in compliance with the requirements. The rules in regard to meter accuracy require that the meter shall be tested once in every 3 years, and the meter shall be considered all right if it registers within 2 per cent. either way, fast or slow. One of the most interesting features of the gas service inspection is the survey of pressures. We have visited all of the cities in the State, more than once, and have set recording gauges at the extremes of the distribution systems, and have the pressure situation pretty well in hand in Wisconsin. The summary of this work will be published within a few days in the annual report, and will be available to those who are interested in it. The requirement as to pressure is a minimum of 1½ inches and a variation during any day of not more than 100 per cent. of the minimum. That is, if the lowest pressure were 1½ inches, 3 inches would be the highest they could go. If the lowest pressure were 2½ inches they could go up to 5. Under the present conditions we believe that this insures satisfactory pressure regulation.

The President—You mean a variation at the extreme end of the main?

Mr. Huddle—For any consumer; the variation over the whole system.

Mr. Whipple I would like to inquire whether or not the testing of the meters necessitates their removal?

Mr. Huddle—As far as we know, there is no satisfactory means of testing a meter in place. They would have to be removed, and if inaccurate would have to be adjusted. There has been some criticism as to that 3-year rule, but at present we are inclined to the position which we have adopted. We hope a little later to publish a good deal of data as to the condition of meters in Wisconsin under the operation of the rule.

Mr. Whipple I would like to ask what make of calorimeter the men in the works get the best results from.

Mr. Huddle The two calorimeters in use in our State are the Junker's and Sargent's. I don't know that I could say anything very definitely as to their use in the hands of the men. According to the last report of the committee on calorimeters of the American Gas Institute, both these instruments were found substantially accurate. If they receive proper attention, I think there is really very little difference in the two instruments. The automatic equipment of the Sargent may be of advantage to some, but others don't care for it and don't use it. They just throw it off and measure the water as they used to. There is certainly an advantage in having the thermometers on the same level, but the calorimeter can easily be modified for that purpose if desired.

Mr. Rice—I would like to ask Mr. Huddle if it is not correct that City No. 18 is charging over $2 per 1,000?

Mr. Huddle—I am not certain it is; but think the rate is something over $2.

Mr. Goodnow—It is an oil gas plant that you mention?

Mr. Huddle—Yes, and is at present the only one operated in the State; the other one was discontinued a few months ago.

Mr. Parker—How much time each day does the use of these instruments and the making of the records require?

Mr. Huddle—Where the calorimeter is set up, and a constant temperature tank provided, I should think it would take a man about 20 minutes, if he did not copy his record afterwards; that is, to make an original record. Of course, if he followed some elaborate form and recopied the notes it would take longer, but I should think 20 to 30 minutes would be long enough. Our inspectors are probably more efficient than the average man around a gas works would be, but I think every man can get at it very easily; it is a very simple operation. I think you could get a better estimate of the time required from the managers who have had the operation of plants where they have calorimeters.

Mr. Clarke—Would it be proper to make some inquiry as to what proportion of the gas companies of our State represented here have a calorimeter? I am very curious to know.

The President—I don't believe you would have to count very high. They might have them in Chicago; but I doubt if anyone else in the State has. Has anyone? We would like to continue this discussion, but we have here an invitation from the Society of Illuminating Engineering, which some members may wish to take in, which the Secretary will read.

The Secretary then read the

INVITATION FROM THE ILLUMINATING ENGINEERING SOCIETY,

as follows:

ILLUMINATING ENGINEERING SOCIETY, CHICAGO SECTION,
OFFICE OF THE SECRETARY, 155 MICHIGAN AVE.,
CHICAGO, ILLS., March 11, 1910.

Dear Sir: The March Meeting of the Chicago Section of the Illuminating Engineering Society will be held March 15, at 12 o'clock (noon) in the Chicago Room, Great Northern Hotel, Jackson Boulevard and Dearborn street, Chicago. The topic for discussion will be "The Necessity for Illuminating Engineering in Small Cities."

The members and guests of the Illinois Gas Association have been invited to participate in this meeting. Luncheon at 85 cents per plate will be served.

Yours very truly,
T. R. BEEBE, *Secretary.*

On motion, duly seconded and unanimously adopted, a vote of thanks was tendered to Prof. B. F. Burgess and Mr. W. J. Huddle for their joint paper.

Mr. Goodnow—I asked Prof. Burgess to give us something on the subject of electrolysis, but his data wasn't available to produce at this time, so he substituted this paper in connection with Mr. Huddle. I am very sure we would like to hear what Prof. Burgess has to say on the subject of electrolysis, and we will live in hopes. So I wish to extend to Mr. Huddle and Prof. Burgess our very best regards and thanks for this paper.

The President—Can we impose upon your good nature again?

Mr. Huddle—As to Prof. Burgess' problem of electrolysis, I am not connected with that work, but if there is anything of interest in the work in Wisconsin, in connection with the inspection of gas and electrical plants, we would be very glad to furnish information to the neighboring States at any time. I might say that the annual report this year will be published in sections, so that it will be possible to give it a little wider distribution, and that the sections containing the report of the engineering staff can be obtained by those who are interested in the work.

APPOINTMENT OF COMMITTEE ON OBITUARIES.

Mr. Pratt—I am not familiar with the by-laws of this Association in regard to committees and resolutions, but I have in mind the death of our good friend, Mr. Fred. R. Persons, and there may have been other deaths which have occurred during the year. I would like to move you, sir, that a committee of three be appointed by the Chair to report proper resolutions in this regard.

The President—I think it is a good plan to appoint such a committee, and if any others who know of deaths during the year, it will be appreciated if you will communicate with the committee. I will name on the committee Messrs. Edward G. Pratt, George F. Goodnow and C. F. Asendorf. We will now stand adjourned until 2 P. M.

FIRST DAY—AFTERNOON SESSION.

The President—The first business in order this afternoon is the election of officers. We will hear the

REPORT OF THE NOMINATING COMMITTEE,

which was submitted by Mr. G. F. Goodnow as follows:

Your Committee begs leave to report that it recommends the following officers to fill the vacancies for the ensuing year:

President—Mr. A. S. Harrington, Chicago.
Vice-President—Mr. Irwin Rew.
Secretary and Treasurer—Mr. C. B. Strohn.
Directors—Two years: Mr. H. T. Crawford, Waukegan, Ills., Mr. Robert B. Harper, Chicago, and Mr. H. J. Mitchell, Joliet, Ills.
Representative to the American Gas Institute—Mr. E. G. Schmidt.

The President—I think you have made a good selection, save in the instance of the latter one. I know very little about the gas business. What is your pleasure, gentlemen?

ELECTION OF OFFICERS.

On motion of Mr. Goodnow the Secretary was instructed to cast the Association's vote in favor of the election of the gentlemen named in the report.

A RESPONSE.

The President—Mr. Harrington, the Association would be glad to hear from you.

Mr. A. S. Harrington—(District Superintendent, Division Street Station, Peoples Gas Light and Coke Company, Chicago.)—Mr. President and Fellow Members of the Illinois Gas Association: This comes somewhat as a surprise to me, and I fully realize the responsibility I assume in taking this office; but I can assure you I won't leave any stone unturned to uphold the high standard that the Illinois Gas Association has attained, and will do my level best to increase its membership and its general standing in the gas fraternity. I thank you gentlemen. [Applause].

The President—Mr. Eustace wishes to announce something about that banquet.

Mr. Eustace—In the matter of entertainment, I am pleased to announce that the Committee has completed arrangements for the dinner to-night and anticipate a full representation of the Association members and their friends. Following the dinner you will be entertained by some of the very best artists that we have been able to secure from the local vaudeville theaters. The dinner will be served at 7 o'clock and I urge you all to secure your table reservations promptly, in order that the Committee may complete arrangements to properly care for the guests.

The President introduced Mr. C. C. Hotchkiss, who read a paper (the joint production by Mr. C. C. Hotchkiss and Mr. R. B. Acker) entitled,

A COMPARATIVE INVESTIGATION OF OILING METHODS, OILS AND DIAPHRAGMS FOR METERS.

[For the text of the paper, see JOURNAL, April 25, p. 803.]

Discussion.

The President—Has anyone had any trouble in oiling meters?

Mr. Eustace—We had that trouble at Peoria. About 3 per cent. of the oil came through the bottom of the seams.

The President—Have you had any other trouble?

Mr. Eustace—None, except that we find some oil is coming on the face of the valve.

The President—Working up under the valve?

Mr. Eustace—Yes, working up on the face of the valve, having a tendency to make the meter a little slow. Some of them become a little gummy.

The President—Will you explain how that comes up?

Mr. Eustace—It is supposed to be non-volatile oil, but it seems to come up through on to the face of valves. Last month we removed 164 oil meters, of which 30 were O. K., 8 were 1 per cent. fast, and 126 were 4 per cent. slow.

The President—All of these had been used?

Mr. Eustace—Yes, sir; from 4 to 18 months.

The President—What sort of oil were you using?

Mr. Eustace—A No. 4 mineral oil, or the standard meter oil.

The President—If Mr. Schiller is in the room we would like to hear from him.

Mr. Schiller—Mr. President, Chicago has had but little practical experience with the dipping meter. We can hardly be expected to tell of troubles we have not as yet had.

The President—You are about to begin to use them?

Mr. Schiller—We are now preparing to put one section of the city on a dipping basis.

The President—Surely there must be some other men here who have had to do with oiling diaphragms.

Mr. Wilkins—I am with the La Porte Gas Meter Company and can talk to you from the manufacturer's standpoint. We went up against about the same game as the U. G. I. did. It was a new thing. I would hate to tell you how many oil leaks we had at the start, or when we first commenced to furnish meters for dipping purposes. By keeping right after it, along the general lines suggested by Mr. Castor, and also by increasing the amount of the air pressure test, we soon worked out of our troubles. We ran the pressure test up to 5 pounds at starting, and found it was too much, because it would blow the center box and side box packing; so we scaled it down to 4 pounds to start with, then to 3, and then finally to 2½ pounds air pressure. It interfered somewhat with the action of the meter, but not to any great extent. It was a kind of compromise matter, anyhow. We found that at 2½ pounds we interfered least with the working of the meter and were also able to find all the oil leaks. We had to lengthen out our side boxes from ¾ inch to 1⅛ inches. That has been our experience according to the inspectors who have had charge of it. If we put 2½ pounds on the meter and no air will show, no oil will show either. The only way was to put the pressure on the meter and then put the meter down in the water and watch it. A man has to have his hands on the meter, and frequently he would mask the leak by not seeing the bubbles coming up under his hands. Again, it would take a considerable time to allow air to get through some leaks that mineral oil comes through quickly. Again, air would come out in minute bubbles until it accumulated enough to form a bubble that would let loose so you could see it; meantime it came out in little bubbles that you wouldn't notice. So we got up what we called the differential gauge, and I thought we had something quite remarkable, but later I found out they had been using it at the Detroit City Gas Company's shops for over a year. The differential gauge is this: You have an air-tight box, the form of which doesn't make any difference, having about the same cubical content as a 5-light meter. You connect the box and the meter and put pressure on both of them from the same source. Then you shut off that source of pressure with an outside valve. The fact of the matter is that, having the same connection, you will have the same pressure in both meter and box. Now you put a stopcock in the line connecting them, and when you shut off the stopcock the pressure in both the meter and the box will be alike, if the meter is airtight. We have arranged a valve in the pipe so that, if there is any flow of air from the box into the meter to replace the air which has leaked out of the meter, it will have to pass through a liquid. This liquid is contained in a sight-feed lubricator glass, with a glass tube running into it. Kerosene is the best liquid for this purpose to get the bubble through that we have experimented with so far. All you have to do is to place several of these testing machines or differential gauges, put the meters on and connect them up, turn on your air, keeping a standard pressure of 2½ pounds in the air pipe for that purpose, and, after both meter and box have filled up to pressure, shut it off. Go on to the next machine and connect it up with a meter, then to the next, and so on until you have finished the four. By that time you come back to the first and the air has had time to adjust itself and you are ready to start observations. We make it a rule to allow meters to set up for 5 minutes, and if there is a bubble in the kerosene it shows, of course, that there has been a decrease in pressure in the meter and a flow of air from the box to the meter through the kerosene to replace it. Inasmuch as the surface tension of kerosene is less than that of water, a much smaller bubble will form than if water had been used; so, roughly speaking, if at the end of 5 minutes there would show up a bubble of air on a meter held under water, it would also show up in the kerosene. In the observation of a meter under the water you might have 5 different leaks, none of which would show up a bubble, but in the aggregate this would amount to a considerable leak. With the differential gauge all these different leaks are brought to the one place and combined for observation. The differential gauge, of course, will show whether the meter is tight or not. In case it is not tight, you have to return to the old system of putting on the air pressure, plunging the meter under water and hunting until you find the leak. It gives you the advantage that if a man knows in advance he has a leak he hunts for it until he finds it; whereas, if he doesn't know whether he had a leak or not, he might stick the meter under water and fail to see the bubble if the leak were small, and pass it over. We found, by keeping records of the work of each man, that only 37 per cent. of the meters, as they came from the meter makers, would pass the differential gauge, consequently we changed our shop practices and cut the pay of the men making the meters. A man got only about half what he got before for making a meter, but he got it back, and something more too, if the meter was tight. We pretty nearly had a strike putting that through, but after about 6 weeks we had the trouble practically remedied, so that now we do not have very much complaint from customers about leaks, and don't have any more shop troubles about them either. We have been experimenting and we brought out a meter this year in which we make practically all locked seams, as we call them, in place of the old lapped seams. We were led to do this by this same oil trouble. If a tinsmith has to make a seam especially tight he turns over one edge, then the other edge, and hammers them together. By that procedure he generally gets a joint that is tight. Now we have brought out a meter in which the principal joints that don't have to be opened for repairs are made that way. It is of the locked seam type. Of course, it will take statistics to show conclusively to what extent that cures the trouble, but the common sense of it is that the same process that makes a tight seam in a corned beef can will make a tight seam in a meter. As to these diaphragms, I would like to ask Mr. Schiller if he took raw diaphragms, diaphragms that had never been oiled, then oiled them and put them into the meters after 24 hours?

Mr. Schiller—Yes.

Mr. Wilkins—That is, the diaphragms were not what we call seasoned?

Mr. Schiller—No.

Mr. Wilkins—Just raw diaphragms, and was the same true of the 300 meters which you treated under service conditions?

Mr. Schiller—The diaphragms were seasoned. That is, they were new meters and contained the seasoned diaphragms furnished by the manufacturer.

Mr. Wilkins—These matters of seasoning and oiling are important features, not only to the manufacturers but to the gas men. I remember that, at the first meeting I attended of the Gas Institute, here in Chicago, a man from England (one of the head men of the meter combination over there) was asked to express his views about the meter proposition, and especially about diaphragm troubles, not only about the latter, but the reason why meters seemed not to hold their proof with water gas. His main reason was that the diaphragms were not as well seasoned, and he pointed out that the meter manufacturers' capacity had been exceeded by the business done by them, so one year they would make extensive enlargements of their plants and find out at the end of the season that they still had more business than they could do, and they never had been able to catch up and allow the diaphragm to season a year like they used to do. They had had a good deal of trouble about the meters not holding proof on this account. Of course, his remarks had to do with English practice and conditions. I do not know if there is a set rule in this country about allowing a diaphragm to season; some say it should be a year—that is some of the old meter makers who learned their trade in Europe—and the others say 6 months. I think the fact of the matter is the most of us make up what we think is a good big batch of diaphragms, and season them as long as we can. I really think, having a small factory as I have, that I have an advantage on that score. I can accumulate a relatively large stock of diaphragms, without their looking so big, and having so much money in proportion tied up, and while I haven't any statistics on it, I am satisfied we do not *send out* any meters where the diaphragms are seasoned less than 6 months. I will also say we used to make up meters where the diaphragms had not been seasoned a month. That was in the winter time when we were making up stock. Of course, these meters were not sold for some months, so the diaphragms season in the meter. I notice that a diaphragm which hasn't been seasoned more than a month, no matter how carefully you wipe it out or how dry you get it from oil, when you put it in a meter and put the meter away for stock, and let it be subjected to a little heat, say 100°, all the oil seems to fry out of that confounded diaphragm and makes a straight shoot for the valves. Of course, that makes a dirty valve, and you cannot prove a meter with a dirty valve, with any surety of getting it anywhere near right under those conditions. Consequently we had a good deal of trouble until we learned better about putting unseasoned diaphragms in meters, and then putting them in storage. So I think from that standpoint it would be well to allow them to get well seasoned with oil, so that after wiping the leather out you will not get any oil on the valves. That doesn't make any difference to the gas companies particularly. Their proposition is this: What effect does that seasoning have upon the life of the diaphragms and the proof of the meter? Does the seasoning have any

effect? My experience is it does have an effect, and I wish in this investigation they had proved four more meters, each oiled with the different oils, putting them in the tanks the same as the others, without passing any gas whatever through them. I rather think you would find at the time the meters were proved, that the meters had not held proof. I don't know, yet I think you would find a considerable change in the proof of these meters. I think you would find an effect on the leathers independently of the effect of the gas condensation upon the oils. For the reason that we do not have any gas plants to study them under working conditions, we cannot study meters ourselves. Through the courtesy of the La Porte Gas Company we make certain small experiments, but we cannot make experiments like the Peoples Gas Company here in Chicago can, and I am glad to see that this question has been started and that some investigations have been made. Take this matter of oil, for instance. We oil our diaphragms with a mixture which comes down from antiquity, with the stamp of approval of years. It costs us approximately 50 cents a gallon. Now, if No. 4 neutral oil is just as good, we would like to know it. It is interesting to us and to the gas companies, because anything that cheapens materials to us will cheapen the gas meters to the gas companies in the end. I sincerely hope these diaphragm investigations will be continued, and I suggest that if possible an investigation on something like this order be made: Take 2 dozen diaphragms, oiling all of them with the same kind of oil; equip a dozen meters with these diaphragms and put them in service at once. Then oil 24 more, allowing them to season a week; equip 12 meters with them, putting them in service, and so on for a month, letting the leathers season a week longer each time, and go on until you get up to 6 months. These meters should be taken out at intervals for test and examination. While it would take quite a number of meters, I think the study and statistics gotten from these meters would be worth the trouble and expense. If we had any proper facilities for doing it, we would do this very thing; but, as I say, we haven't the services of a gas company. With all the courtesies that the La Porte Gas Company would give us, I don't think they would allow us to monkey with their customers to that extent, but in the city of Chicago I should think it could be done. That should settle definitely whether or not there is anything in this seasoning business. If there is the gas companies should get up specifications requiring the seasoning for a certain length of time for their meter diaphragms. This would be advantageous to all parties, as we would *all* have to do it, and you would get a better quality of meters, if there is anything in the diaphragm-seasoning theory. [Applause.]

The President—Is there some one now present who has had some experience with diaphragms; we would like to hear from the gas managers as well as the manufacturers. Is Mr. Brown, of Milwaukee, in the room?

The Secretary—He has just gone out.

The President—Just gone out. Can someone capture Mr. Brown? The Secretary has a letter to read on this subject.

Mr. Castor—Replying to your letter of the 9th, asking for information relative to the development of oil leaks in repaired and new meters, before same leave our meter house, I submit the following: Our experience has shown that the light, neutral machine oil, introduced into the diaphragm compartments of meters, in order to make these meters of the dipping class, will penetrate the bottom seams and corners that have previously withstood heavy air or gas pressure, and which will remain tight under water and condensation accumulations in the meter in service. We are not prepared to say that the neutral oil affects the soldering, but rather believe that the oil leaks are due to the high penetrating qualities of the oil itself; and, due to the fact that it is non-volatile, a leak will not stop after it has once developed, as is often the case with condensation leaks. From the meter maker's standpoint, all meters should be sent out with the idea that they are to become dipping meters, consequently, the most careful work and inspection of same must be done to provide against the development of oil leaks after the meters have been handled and set on the consumers' premises. The only remedy with the present construction of dry meters to prevent oil leaks is to exercise greater effort at this time to obtain better soldering and sweating of bottom seams and corners, as the old method has proven unsatisfactory. I would suggest that the four edges of the meter bottom be deeply flanged and tinned, that the flanges, where same lap at bottom corners, be thoroughly sweated together, that greater care be exercised in sweating all seams at bottom of meter, and that each bottom corner be well loaded with solder from the outside, after the fronts and backs have been put on. In addition to the above, the tinning of the bottom flange of the meter fronts and backs in a hot tin bath might safely be suggested at this time, as there seems to be a tendency for the oil to penetrate through the metal where same is bent in forming the flange, and the tin consequently cracked or drawn very thin. Our practice is to tin all such flanges in a hot bath, using a rosin oil flux, simply knocking the surplus tin off after removal from the bath, but not to wipe off same. The new meters purchased for use in Philadelphia are, first, received at our meter house, and there made dipping. After standing for 2 or 3 days subsequent to introducing the oil, we find about 5 per cent. of these meters showing oil leaks, at bottom corners 70 cent., along bottom seam of meter fronts and backs 25 per cent., and along the short or side seams 5 per cent. Previous to exercising extra precautions to prevent oil leaks in meters repaired at our meter repair shop, about 15 per cent. of the meters showed oil leaks at the bottom seams and corners within a day or two after putting in the oil, all seams having previously passed a 22-inch pressure test. In order to reduce this percentage of leaks we adopted the practice of turning up the side flanges, where same lap the bottom flanges, at the bottom corners of the meter, and cutting off the side flanges at an angle of 45°. The surfaces of the bottom and side flanges that would be in contact with each other, when the side flanges were again bent back to their original position, were thoroughly tinned with a soldering iron, after which the side flanges were hammered back into their original position and the flanges sweated together and tinned. In addition to tinning and sweating the flanges, the bottom corners are heavily loaded with solder after the fronts and backs have been carefully sweated on. The above practice resulted in reducing the percentage of oil leaks to about 3½ per cent. of the meters cased in and made dipping at our shop.

The President—I notice that Mr. Hopkins is here.

Mr. Hopkins—I believe I have nothing further to add, except to explain the circumstances attending the writing of his letter by Mr. Castor. When the paper under discussion was first called to my attention I thought I could not attend this meeting, and it occurred to me that a letter from Mr. Castor, in which he described the experience that he had had with dipping meters that leaked mineral oil, together with his suggestions as to the proper method of overcoming this difficulty, would be a matter of considerable interest and value in connection with the discussion of this paper. I thereupon wrote Mr. Castor, telling him of the excellent work that had been done by Messrs. Acker and Hotchkiss, and asked him whether he would be willing to write a letter which would be read in connection with the discussion of this paper, and he very kindly volunteered to do so. It seems to me that the matter of leaks in these meters is one of great importance and we should all co-operate in our efforts to overcome this trouble, and in this connection I think the suggestions of Mr. Castor are of great value to us. As to the matter of seasoning meters, all meter makers are interested, and I wish to join in the expression of the hope that these gentlemen, who have done their work so thoroughly and so well, will continue in their good work and will perhaps make another report next year on the matter of seasoning diaphragms. Of course, the objection made by Mr. Eustace, as to the oil getting on the valves of the meters, is one that ought to be carefully investigated.

Mr. Wilkins—I think about that matter of oil getting up on the valves, if having made our meter we can get it proved with clean valves, then oil it, even though the oil gets up on the valves afterwards, then set the meter out in service and let it run a little while, we will find that the trouble from dirty valves doesn't affect the proof at that time. It is evident that the trouble with dirty valves is that we don't have oil enough to lubricate them, but we do have oil enough to make them sticky. Of course, with water gas, which is the only kind you oil meters for, you will need oil enough to keep them lubricated all the time, and if you do that, you will not have this dirty valve trouble. In this connection, I understand that Mr. Brown, of Milwaukee, has made some experiments. He has been up against this kind of thing. I understand they use there a large amount of coke oven gas, which is especially bad for dirty valves. He made some remarks at the Wisconsin meeting, a couple of years ago, on lubricating the valves. Of course, this is contrary to all principle in the meter business, according to the professionals, but it seems that after he got enough oil on the valves to lubricate them, he didn't have dirty valve troubles. While that is very interesting I think it should be investigated further before anybody adopts the practice. In fact, I understand Mr. Brown has not adopted it, but intends experimenting further. Going back to the original propos-

tion. If you make these meters dipping, you need not fear as to the oil changing the registration, and in order, it seems to me, to determine whether the meter is running correctly under these circumstances, the diaphragms should be oiled up before the test is made; that is as I understand it. I would like to ask Mr. Eustace one question. As you take these meters out of service, do you test them or let them stand? As soon as you took them out of service did you check them up?

Mr. Eustace—No; sometimes they remain in the shop 48 hours before they are proved.

Mr. Wilkins—I think if you did not leave them in the shop 48 hours, but got your check on them as soon as possible after they came out of the service, you would not find that slowness.

Mr. Eustace—There was some naphthaline on the valves. We had one set in the shop for 15 months, and the meter showed oil on the valves, but it was O.K. on test.

Mr. Wilkins—That may be the trouble; the whole thing should be studied. The conditions are entirely different with water gas. It is an entirely different subject than in coal gas. There are no troubles with coal gas meters, but the other is entirely a new thing, and it has never been studied into like it should have been.

The President—How long have you been oiling meters at Peoria, Mr. Eustace?

Mr. Eustace—About 2 years.

The President—How many meters were oiled during that time?

Mr. Eustace—About 3,000.

The President—The object of this discussion is to determine whether the fault is due to the construction or the use of oil in the meters. If anybody has had any trouble I wish he would state it. Either nobody has been oiling meters or they haven't been troubled. I tried to get Mr. Brown to discuss this paper, but he seems to have stepped out of sight and refuses to discuss it. This is a rather short discussion on this paper. Mr. Hotchkiss, would you like to answer some of these remarks; you can hardly call them criticisms?

Mr. Hotchkiss—With reference to leaks in dipping meters, we have started to investigate the solubility of the soldering flux in the various kinds of drip and diaphragm oils. Another point that should be looked into is using neutral mineral oil. To be sure that it is neutral oil, because, take it in the process of purifying petroleum distillates sulphuric acid is used, and it is very likely that in spite of treatment with caustic soda a trace of acid may remain in the oil.

Mr. Rice—I would like to ask Mr. Hotchkiss if he knows about this new oil the Standard Oil Company recently brought out. They have recently sent out men, and also circular letters, asking companies to substitute in their requisitions gas meter oil for the pale neutral oil, saying the gas meter oil is superior and they prefer to furnish it to the pale neutral oil.

Mr. Hotchkiss—I have no information on the oil you speak of, Mr. Rice. We determine free acid in the mineral oil by boiling the oil with water, separating the washings from the oil in a separating funnel, and testing, qualitatively, with litmus, quantitatively, by titration with tenth-normal caustic patash, using phenolphthalein as indicator. We use No. 4 neutral mineral oil. Perhaps Mr. Schiller can tell you about that.

Mr. Schiller—No; we don't know anything of the Standard Oil product referred to. The oil used was supplied to us as No. 4 neutral mineral oil, the kind we understand was developed by the experience of Philadelphia.

The President—What is the price of that oil?

Mr. Rice—They have dropped the price from 24 cents to 12 cents. Shortly after we received this circular we received several letters from outside companies asking us if we knew anything about the Standard Oil Company's gas meter oil, as they understood the Standard was not going to supply the pale neutral oil any more.

Mr. Hotchkiss—I might add that we did not attempt to test the meters without passing gas through them. Very likely there may be some differences in registration, because of the presence of rapeseed oil, a semi-drying oil, in the new oiled diaphragms.

Mr. Wilkins—My suggestion was to take four of them, one for each kind of oil. May I inquire to just what extent you tested the mineral oil for acid?

Mr. Hotchkiss—We used blue litmus paper. That will show acid.

The President—Would anyone else like to speak on this before we go to the next paper?

Mr. Parker—One gentleman suggested that he had no trouble with coal gas meters. What are we poor wretches going to do who furnish a mixture of water and coal gas?

The President—Well, I guess you are up against it.

On motion of Mr. Parker, a vote of thanks was tendered to the authors who prepared a most excellent paper.

(To be Continued.

A Hint from Biloxi, Miss.

Mr. M. H. Hanley, writing from Biloxi, Miss., under date of the 4th inst. (he is connected with the Gulf Coast Gas Company of the named place), forwards a photograph which is reproduced in the illustration herewith given. Mr. Hanley says that the Company is not at all standing still; to the contrary, it is quite alert for the securing of new business. To this end Manager D'Alemberte has arranged

for the placing of several miles of mains along the beach front of the Gulf Coast, which is sure to open up for it many districts, the residents of which will yield to the Company many consumers on illuminating account and more on cooking, heating, etc. Accounts of the progress of the Company show that the residents are taking a vastly greater interest now in gas for fuel use than heretofore recorded.

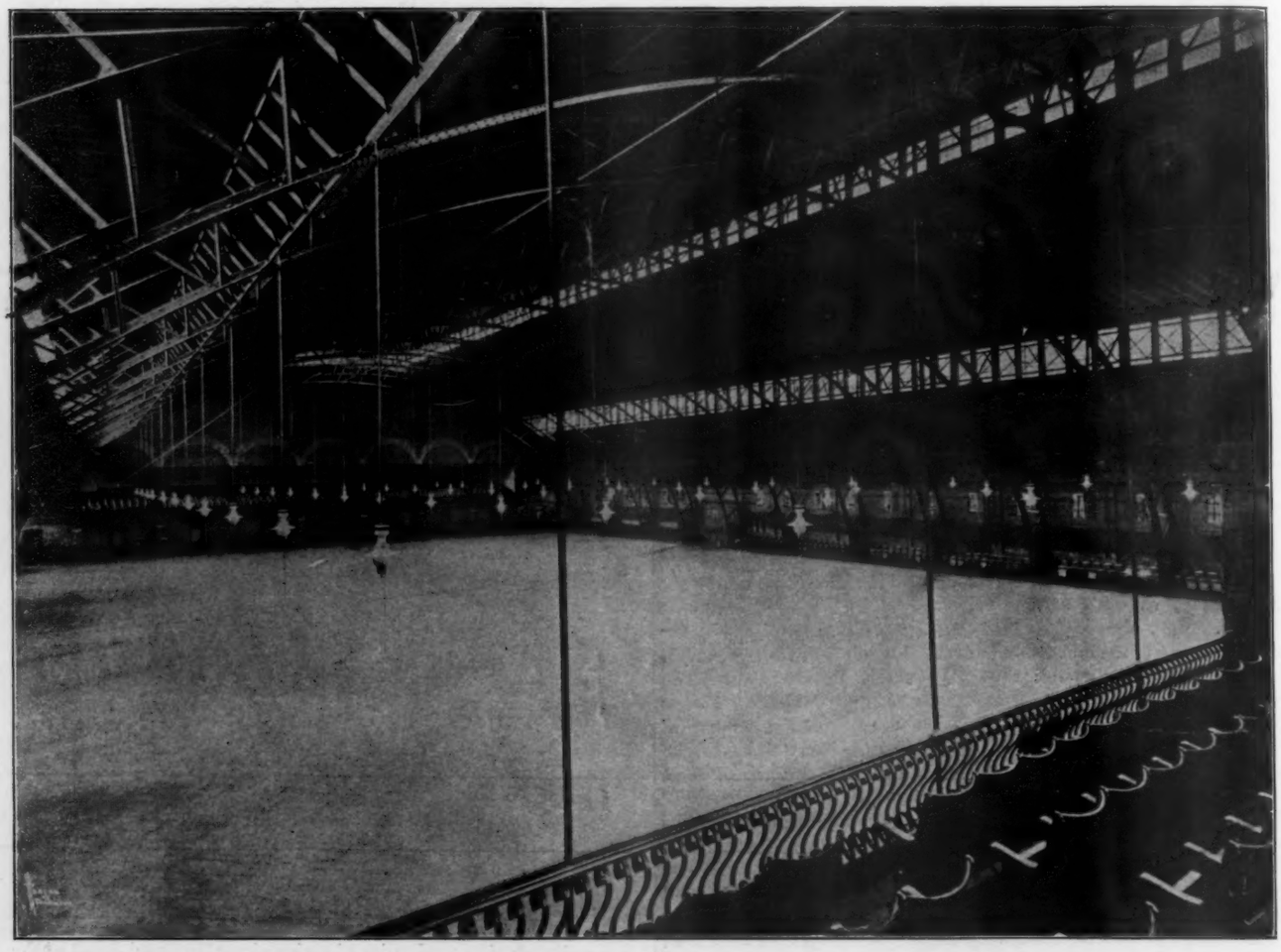
A Huge Armory Effectively Lighted by Gas.

This entire building, from the sub-cellar vaults to the lookout tower, is lighted by gas, a determination that was reached after the expenditure of many thousands of dollars on beautiful decorations interiorly, in which the most modern shades, artistic hangings and designs were employed.

Finding that electric lighting planning could not be depended on to bring out to the best advantage the variously colored and tinted objects of the different compartments, and after making a scientifically thorough demonstration of both electric and gas mantle illumination, the Armory officials selected, from merit, the incandescence gas system of lighting. The illuminative effect in this building is unsurpassed because of the soft and daylight-like tones imparted to the brilliancy of the beautifully illuminated drill room, lighted only by means of gas arcs. The drill room, which is 120 feet by 240 feet, is outfitted with 60 gas arcs, of the 4-mantle type each, covered with light, opalescent globes. The gas arcs are spaced about 22 feet apart, and are at a height of 15 feet from the floor.

This drill room is unquestionably the most brilliantly illuminated room in any large edifice in the State, and under these lights many of the leading social functions of the city are held. It was in this room and under these brilliant lights that Mme. Melba and Nordica and Mons. Caruso, Damrosch, Sherman and others have entranced thousands.

The spacious galleries, halls and various quarters are lighted with either gas arcs or the reflex mantle burners. In the officers' rooms are shown beautifully constructed domes of hammered, antique brass design, and in the glass panels of these domes are shown handsomely



Interior View of the Scranton Armory (Colonel Stillwell's 13th Infantry) which was Recently Acquired by the State.

outlined figures of the Pennsylvania Coat of Arms, alternating with stacks of guns and groupings of cannon balls, swords and drums. On the lower of these art glass panels is the Coat of Arms alternating with those of the 13th Regiment. The fixtures have all been made specially, so as to blend with the elegant and artistic decorations and furniture.

The entire Armory building is equipped with a total of 60,000-candle power of various types of gas mantle lighting, and while electric lighting is done for 2 cents to 10 cents per kilowatt in Scranton, the Armory officials find that they secure about 60 per cent. more light from gas at 40 cents cost and with an uninterrupted and uniform service. This splendid installation was made by the Hyde Park Gas Company, of Scranton, Pa. For the facts in this connection we are indebted to the courtesy of Mr. E. M. Stack, of the Scranton (Pa.) Gas and Electric Company.

The Dear Public.

[Prepared for the JOURNAL, by "C."]

The attitude of the public toward us is only a reflection of our attitude toward them, and this has a great deal to do with our success. The malevolence developed, by reason of the methods followed when gas had a monopoly of the lighting field, is being softened and smoothed away through modern methods; but it will still take many years of effort to make the revolution complete. The inherent right of every man to kick about his gas bill is seemingly a pleasurable privilege, exercised in season and out of season and both with and without an exciting cause. It must be met with as much seriousness as a case of highway robbery, although some of the most aggravating cases arise from an increase in the monthly bill of the amount of 100 feet of gas when the total bill is less than a dollar. We all smile inwardly at the party who makes a loud complaint when he gets a bill for 60 cents when the previous ones had been but 50 cents, and is emphatic in his declaration that "there must be something wrong," but we cannot smile outwardly or make remarks eminently appropriate to the occasion. The manager who is fortunate enough to possess, either personally or in his assistants, the tact and sincerity which will cause the complainant to see the error of his ways, has a most valuable asset, but to make this impression permanent and favorable it must be founded on fact.

There is no better way to create a good impression than that of living up to your promises. Poor results follow the acceptance by the head of the concern of the principle that "promises are made to be broken," and allows the idea to pervade the establishment. Distrust of the public soon follows this policy, and then distrust of the employees spells for loss. A promise made should be regarded as binding as one made on a note in order to bring our dealings to the proper moral plane. The habit of telli ng the voice over the telephone that "we will send someone up right away" to attend to the complaint, and then forget about it, or make the matter one to attend to at "any old time," is not one calculated to gain the favor of the public. If it is not possible to state the day and hour when we will keep an appointment, the party should be so informed by the statement that it will be attended to as soon as possible, or as soon as one of the boys returns to the shop; and then see that it is done. If there is a job on hand which the party is in a hurry for, as they invariably seem to be, instead of telling him that "one of the fitters will finish the job he is on at noon to-morrow, and he can commence on your job at 1 o'clock," it would seem far better to say, "One of the fitters expects to finish what he is doing by noon to-morrow, and he can go at your job as soon as he is through there." In the first place a positive statement has been made, based on an uncertainty, in which we have needlessly assumed a risk. It is possible that the work will take longer to finish than was supposed and the new job is not started at the time promised. The customer has been told that you will be there at 1 o'clock, and he is, very naturally, expecting you. When no one shows up he at first wonders and then he thunders. Nine times

out of 10 you have lost his friendship, and by a broken promise have sown in his mind the seeds of distrust. This puts him in good shape to harken to the woes of others, which only adds to the wrong impression he has formed, and what was a good "prospect" has faded away.

On the other hand, if the second statement is made to him he is asked to share an uncertainty with us, to which none object, and has the certain and easily kept promise that his job is next. It sometimes happens that the party has had dealings with other than gas people and arbitrarily announces that his work can be completed at such a time or you can "cut it out." Local conditions will govern the treatment in such a case, a good "bluff" being an excellent remedy for a "bluffer," and a frank understanding with others, in which they are shown why we must treat all alike, will make things easier. When you reach the point that the remark, "You can depend on what Mr. 'Gasco' says," becomes quite common, you are making the best possible advance.

An abused confidence is one of the hardest things in the world to restore. The party unused to gas must accept our statements, when looking for information, and if they are frank and truthful he will not complain, but if they are misleading he does not develop into a friend. When a party is sold an appliance, and told that the gas bill will be only so much, they have confidence that such will be the case, and when the bill is presented, if it exceeds the stated amount, Mr. "Gasco's" stock is immediately below par. If the truth is told, and the party made to understand that there is no way of knowing what his bill will be, but that this appliance will consume so much, and that one so much, and the other so much, gas per hour for every hour they burn, and that the hours pass quite rapidly, but if care is used, as per the usual card of instructions accompanying the appliance, he will be able to determine at the end of the month about what his bill will run for the work he wants to do. Then, in addition to this, if he can be persuaded to read his meter his friendship is more easily retained.

At a recent meeting an instance was cited where a salesman had been appealed to by a party, who imagined her stove was out of repair, and that she had to buy a new one, but which the salesman fixed up as good as new, at no expense, and saved the party the needless outlay. It is surprising that such procedure was criticized, but such is the case, the action being termed poor commercialism.

Judged by the standard of poor commercialism it must then stand as an example of good humanitarianism. It was; and more than that—it was commercialism on a little higher plane than it travels today—it was an application of the Golden Rule in a business transaction, and the reward for such acts, while not always immediately apparent, is always sure and always bountiful. Commercialism which permits greed to overcome the small amount of brotherly love humanity demands will always have an up-hill pull and no lasting success. You cannot profitably discount the Golden Rule.

It would seem to be short-sighted policy to put out anything but honest goods, cheap goods too often acting as veritable boomerangs. We can keep the standard of our goods high just as easily as to have it low, and there is no comparison in the results. When this is done and the minds of all employees directed in the same channel, the public is starting your way; and when you are telling them about what you have to sell you can speak from the heart. A most forceful and clear cut plea for honesty in commercialism was recently made by Hugh Chalmers, as follows: "* * * The second duty of an advertiser to the public is to tell the absolute truth about the thing he has to sell. Untruthful advertising might succeed for a while, but it would fail in the end. There is no surer law than this. The only business that succeeds, and keeps on succeeding nowadays, is the business that is built on the groundwork of honest statement.

"The third duty of the advertiser to the public is to back up every honest claim made. It is the duty of the advertiser to take care of the people who buy his goods. It is his duty, especially if he is selling a specialty article, to help them in every way he possibly can to get the maximum amount of service out of the thing they have bought. The duty of the advertiser does not end with the sale. The only right kind of a sale is the one where the buyer and the seller mutually profit, and it is the seller's duty to help the buyer in every way he can to get all out of his purchase that he thought he was getting when he bought."

This exemplifies what was called poor commercialism, as noted in a previous paragraph, but it is the kind of commercialism that wins, and which will win the public to stay won.

Items of Interest
FROM VARIOUS LOCALITIES.

THE financial dailies of last Monday printed the news that Messrs. H. L. Doherty & Co., of New York, had purchased, from Messrs. W. A. Williamson and C. M. Warner, the properties and franchise rights of the Bristol (Tenn.) Gas and Electric Company.

SOME days ago a deputation of dentists requested a hearing from the Special Committee of Councils, Cleveland, O., charged with the purpose of determining whether or not it would be a good plan to shut down altogether the artificial gas plants of that city. The hearing was accorded and during the continuance of the investigation Dr. L. E. Pettibone, appearing for the dentists, said: "We must not have natural gas, since it would not serve the use to which we wish to put it. The natural gas flame is not sufficiently steady." A postponement was agreed to, with the understanding that other testimony in respect of the merit of the petition be submitted.

THE Cincinnati Gas, Coke, Coal and Mining Company has petitioned the Secretary of State of Ohio for permission to reduce its capital stock from $1,000,000 to $100,000.

AT the annual meeting of the Cincinnati Gas Light and Coke Company the Directors elected were: S. R. Burton, Jno. Omwake, C. B. Montgomery, L. H. Brooks, C. H. Davis, J. T. Carew, J. B. Foraker, Jr., M. E. Moch, Norman G. Kenan, L. J. Hauck and N. S. Keith; President. L. J. Hauck; Secretary, Theodore Clauss.

"W. M. T.," writing under date of the 7th inst., incloses this from Marquette, Mich.: "The management of the Marquette (Mich.) County Gas and Electric Company secured the services of Mrs. Irene Rogers, to deliver a series of lectures on cooking by gas in Marquette, on Tuesday of last week, the series lasting to the close of the week. The demonstrations were held in the Jones's block office of the Company and they were attended not only by many of the 'ordinary' families of Marquette, but by most of the social queens of the city. Additional incentives to the cause were the giving away of a gas range to the holder of the fortunate admission ticket. The placing of gas appliances in Ishpeming and Negaunee will undoubtedly be greatly stimulated by the Rogers' demonstrations. It is only fair to say here that, as a lecturess, Mrs. Rogers is fully competent, and her personality adds largely to the appropriateness and lucidity of her action and discourse."

A CORRESPONDENT in Philadelphia forwards the following under date of the 5th inst.: "The 28th annual report of the United Gas Improvement Company, for the fiscal year ended December 31, 1909, was submitted to the shareholders and approved by them at the annual meeting on the 2d inst., on which occasion the retiring officers were re-elected. The report, which was enthusiastically received, showed a record breaking year, the total earnings amounting to $7,649,234, an increase of $552,962 over the previous year—a year that was in itself a record breaker. The net earnings were $6,656,108, a gain of $329,401 over the previous twelvemonth. Of this amount $3,790,371 went to the shareholders in the shape of dividends; $692,500 was invested in sinking funds, created during the year 1908, to retire at the end of the lease the investment in the Philadelphia gas works, and $2,173,237 was carried to undivided profit account. The new business departments of the United Gas Improvement Company, and of all the other companies in which it is interested, were entirely reorganized during the past winter, and special preparations have been made for a very active canvass for new business during the spring and summer of 1910, by the remodeling of old offices or renting new ones, by enlarging the force of canvassers and demonstrators, and by a considerable increase in advertising appropriations. What is going on all through the system may be seen at the Company's various offices and showrooms in the city. The Spring Garden and Kensington offices have been remodeled and new branches have been opened in the Frankford, Manayunk and West Philadelphia districts. These districts offices, while filling adequately the purposes for which they were intended, did not give the Company a central store devoted exclusively to the sale of gas utilization appliances, which the large business warranted, particularly since the taking over by the Company of the retail business of the Welsbach Company in Philadel-

phia. The Company accordingly secured a long lease on the property at the northeast corner of 11th and Market streets, and erected there a building where is being made every day a display of appliances second to none in the country. The management believes that this display of interior and exterior lighting here shown, together with the very comprehensive exhibit of industrial fuel gas appliances, cannot fail to have a marked effect in increasing the sales of gas in this city. Attention was also called to the recent installation of high pressure lights surrounding the Company's home office building at Broad and Arch streets. Already this activity in the new business department shows very gratifying results, as the sales for the first 3 months of 1910 show the following ratio of increases over the sales for the corresponding months in 1909. For instance: From the properties outside of Philadelphia; artificial gas, 8.80 per cent.; natural gas, 16.90 per cent.; electricity, 19.8 per cent.; for Philadelphia, 6.78 per cent. Mr. C. Stuart Patterson presided over the meeting, and the records were ably handled by that prince of secretaries —Mr. W. F. Douthirt. The reports having been read, on motion a resolution was adopted congratulating the Directors and other executives on the excellence of the year's showing. The shares voted on represented seven-elevenths of the total capital."

Mr. B. F. Bullock, Superintendent of the City Gas Works, Fredericksburg, Va., writing under date of the 10th inst., forwards the following:

To the Editors, American Gas Light Journal: "I read with great interest, in your issue for May 9th, the item contributed by Mr. A. L. Spencer, but must confess that I have not met Mr. Spencer in the local lighting field. The article, as printed, appeared in one of our local papers, but it was only a flash-in the-pan, our Honorable Mayor having been mistaken. He spoke before he knew what he was—well, before he knew! The said electric light company has the right to sell to its consumers, and as there is only one electric company here, which gives it quite a free field and much license. The gas plant, which is owned by the city, and sells supplies by direction of the City Council, the Honorable Mayor had really nothing to do with. While he detailed an officer to notify me to stop, said message did not reach me through official channels, or until I had been notified by others. On hunting up the Mayor he told me to 'forget it,' since he had no authority over the gas plant. It is true the Council has been petitioned to stop me from selling Welsbach and other lighting goods in the name of the city; but I told them that we would soon lose a lot of our consumers, through their not being able to get supplies when they wanted them. The petition was passed into the Light Committee, and there it has remained, 'even unto the present day,' where it is likely to remain for some time to come."

Mr. H. Koppers, the well-known coke oven constructor, whose headquarters are in Joliet, Ills., has been instructed by the Woodward Iron Company, whose location in Woodward is close to Birmingham, Ala., to construct for it 60 by-product ovens of the Koppers' type. This installation will include Koppers' direct ammonia recovery process, and will be constructed with a capacity of handling the by-products from the plant when enlarged to 120 tons in the future. The coke production from the 60 ovens will equal 702 tons per 24 hours, producing besides 4,700,000 cubic feet of gas, 4,700 gallons of tar and 9.4 tons sulphate of ammonia. This oven is of the type of oven so extensively favored by the U. S. Steel Corporation. That the Koppers type of oven construction gains favor in this country looks to be well proved when it is noted that the first Koppers' ovens built here were constructed in 1903, and to date the total is 5,609.

The proprietors of the Amsterdam (N. Y.) Gas Company have authorized the Gas Machinery Company to construct a new water gas apparatus for them. The contract includes the necessary miscellaneous machinery. The Amsterdam people are also putting in a retort house governor, in order to make sure of securing the best results possible from the coal gas benches.

Write to the Humphrey Company, of Kalamazoo, for a copy of its handsome catalogue, indexed as No. 11, just off the press. Its matter has to do chiefly with the Company's really meritorious Instantaneous Bath Water Heaters, Automatic Water Heaters and Range Boiler Water Heaters, which matter explains their value and worth in manner readily understandable. The Company will cheerfully mail copies of "Catalogue 11" on request.

General Manager J. D. Shattuck, of the Philadelphia Suburban Gas and Electric Company, in a letter to Editor Beeson, of the Company's newsy publication, yclept "Suburban Service," had this to say respecting the doings last month on the occasion of the opening of the Company's new showrooms and model gas kitchen in the Chester division: "Our splendid display of gas appliances and our all-gas kitchen have been opened for the inspection of the public. During part of the opening day our three demonstrators prepared lunch in the gas kitchen in full view of those assembled. Several people from Chester and other parts of the country were served. All were delighted with the up-to-the-minute features of the rooms, and voted the show and their visit thereto complete successes, and altogether worth while. We had and have on exhibition a good many of the 800-odd ways that gas can be advantageously used, and some of these ways are rather cleverly shown."

At the annual meeting of the Chester (Pa.) Gas Company, held in the Delaware County National Bank, the afternoon of the 5th inst., the Directors elected were: Messrs. O. H. Cloud, E. B. Johnson, Samuel A. Crozer, J. H. Roop and Clarence Deshong. The Directors subsequently perfected the following organization: President, J. H. Roop; Secretary, E. B. Johnson; Treasurer, J. H. Roop.

The Providence (R. I.) Gas Company, as per the filing thereby of a statement of the gross earnings, for the quarter ended March 31st, with the authorities, shows the same to have been $324,736.65. Three per cent. of that sum (amounting to $9,743) was paid into the city treasury under the working of the royalty ordinance. For the corresponding quarter in 1909 the returns were, respectively, $293,800 and $8,814.

Mr. Henry Bainbridge Chapin, a Director in the Boston Consolidated Gas Company, died at his home in Marlboro street, Boston, the morning of the 7th inst. He was in his 53d year, having been born in Springfield, Mass., October 2, 1857. He was a member of the Harvard College Alumni, Class of 1880, was second member of the well-known Boston firm of Schirmer, Chapin & Emmons, and was perhaps as well posted in the instance of freighting and freight rates as any other resident of New England. At one time he was General Traffic Manager of the Boston and Albany Railroad. His wife survives him, also a son—John R. Chapin.

Mr. F. C. Slade has resigned the position of General Manager of the Willimantic (Conn.) Gas and Electric Company. His successor is likely to be Mr. Wm. M. Lewis, of Rockville, Conn.

At the annual meeting of the Lebanon (Pa.) Gas and Fuel Company these officers were elected: President, H. L. Doherty; Vice-President, Frank Frueauff; Treasurer and General Manager, Wm. H. Merritt; Secretary, Miss Agnes Grittinger.

At a meeting of the proprietors of the Hamburg (Pa.) Gas Company and the Hamburg Electric Light Company, held in the Reading offices of Mr. John A. Keppelman, a plan to consolidate the interests of the named Companies was agreed to. Hereafter the corporation will be known as the Hamburg Gas and Electric Company, capitalized in $20,000 and bonded in $50,000, Of the latter only $40,000 will will be issued at present.

Mr. A. H. Vail has taken up his duties as Resident Manager of the City Gas and Electric Company, of Paris, Ills. If we mistake not Mr. Vail was formerly in the employ of the Jamaica (L. I.) Gas Light Company.

Mr. C. C. Mattison has been appointed to a responsible position on the new business staff of the Nassau and Suffolk Lighting Company, of Hempstead, L. I.

"W. T. S.," writing from Jacksonville, Fla., under date of the 8th inst., says: "I fail to note any mention in our Journal (meaning, of course, the American Gas Light Journal) of the April outing of the rank-and-file of this Company, which outing consisted of a trip to Mayport on the fine steam yacht *Cosette*. Here, 50 strong, we hooked the hake and the mackerel (bonita and otherwise), the blue and the sword in such profusion and weight that the deltoid muscles of many were elongated from the strain as we pulled them in."

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

MONDAY, MAY 16, 1910.

The Market for Gas Securities.

The bears have evidently taken to cover, especially in respect of Brooklyn Union. Last week these shares sold at 137, to-day (Friday) at noon 147 was bid for it. Consolidated, too, seems to have taken on heart of grace; it came in this morning at 139¼ to 139½. These increases are simply in keeping with the vagaries of the general market, and are in no sense in line with anything like real values. The changes in these latter, through panic or flush times, are continuously making to the good.

Washington (D. C.) looks to have another of its swift moves on, and this time it surely will well "move beyond" 400. By-the-way, some of the magnates in-and-around Capitol Hill are beginning to figure out that Manager Hart is Manager in fact as well as in name. More power to him.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

MAY 16.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$73,177,000	100	139¼	139⅜
Central Union Gas Co.—1st 5's, due 1972, J. & J.	3,000,000	1,000	98	101
Equitable Gas Light Co.—Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	3,500,000	100	155	165
New Amsterdam Gas Co.—1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101½
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	25	50
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98½	100½
New York and East River—1st 5's, due 1944, J. & J.	3,500,000	1,000	104	107
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union—1st 5's, due 1947, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	—	75
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	146	149
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	399,650	509	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	.65	.70
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	500,000	1,000	90	96
Boston United Gas Co.—1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47¾	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	73	73½
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,860,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	29,500,000	100	92	93
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90¼	91
Preferred	3,036,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	—	105
Mortgages, 6's	3,600,000	—	—	118
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	458,000	—	102	105
Detroit City Gas Co	5,000,000	50	—	50
" Prior Lien 5's	4,619,000	1,000	97	100½
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	108	108¾
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis	10,000,000	100	101	101¾
Preferred	2,500,000	100	90	95
Bonds	10,000,000	1,000	102½	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip, due 1910	100,000	25	60	60½
Massachusetts Gas Companies, of Boston	25,000,000	100	80⅜	81⅛
Preferred	25,000,000	100	91	91⅛
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	108½	108¾
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¾	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—1st Mtg. 5's	751,000	1,000	100	102
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgages, 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112¼	115
General Mortgage, 5's	2,465,000	1,000	90	95
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	100	104
Washington (D. C.) Gas Co.	1,600,000	200	357½	362½
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	361	—

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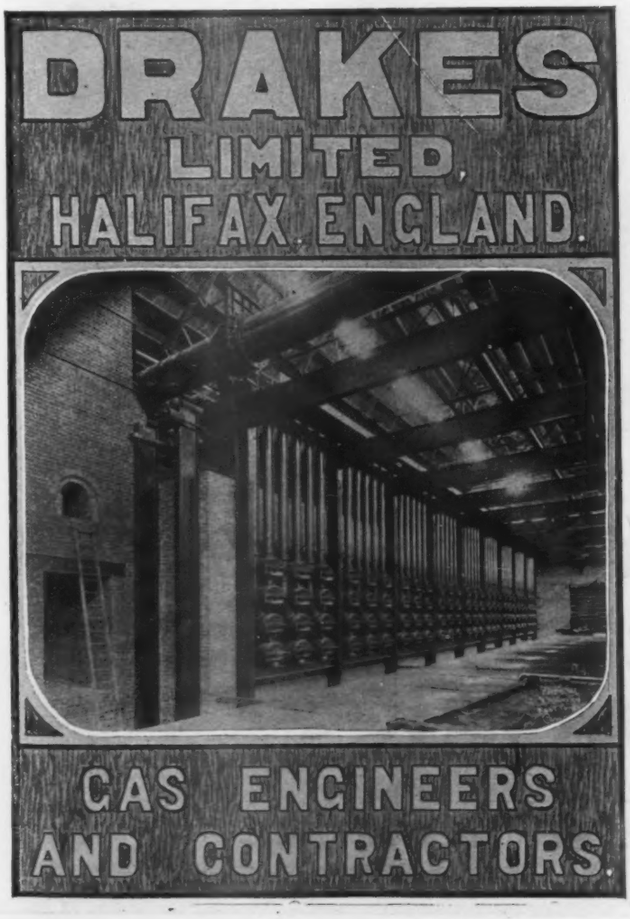

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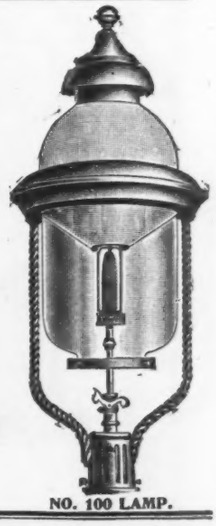
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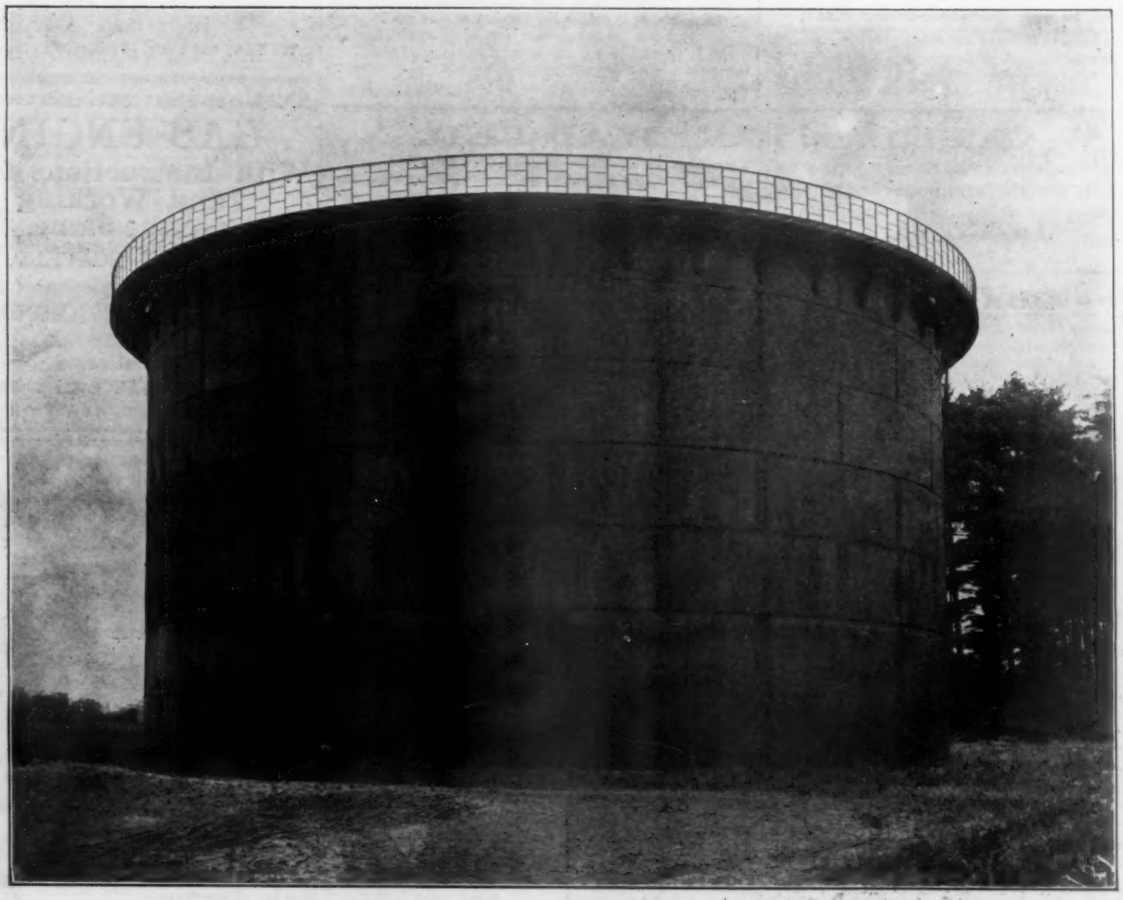

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OF WORK

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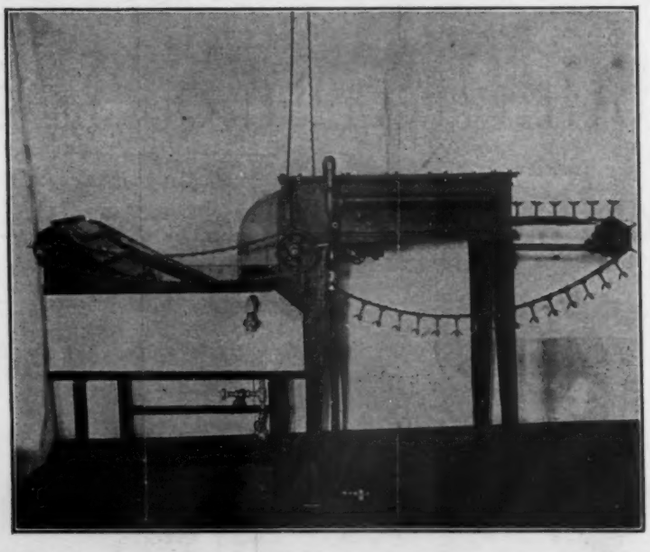

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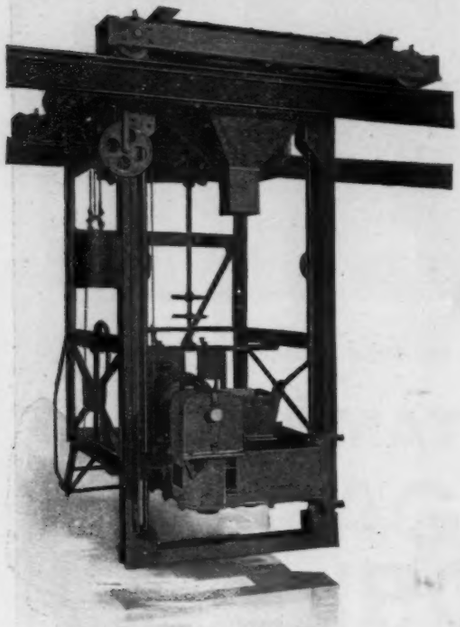

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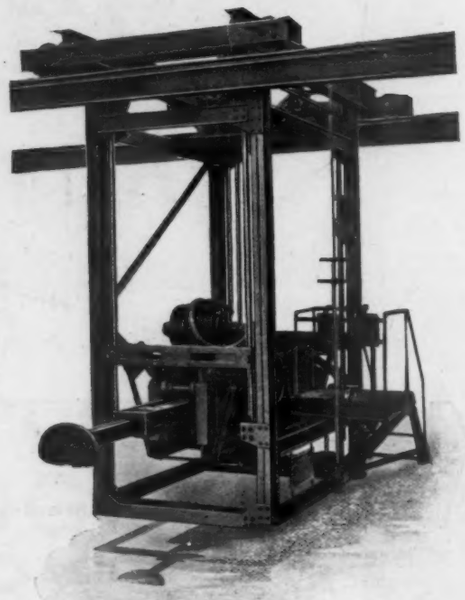

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INVERTED GAS ARC LAMPS
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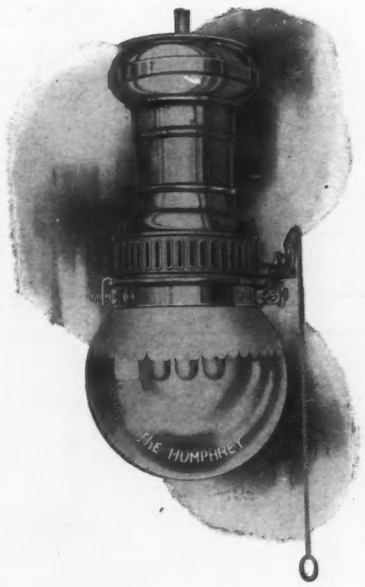

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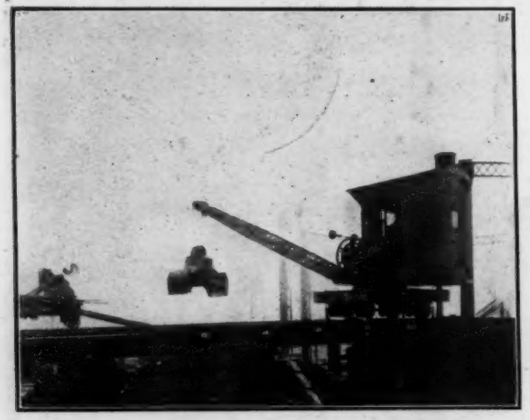

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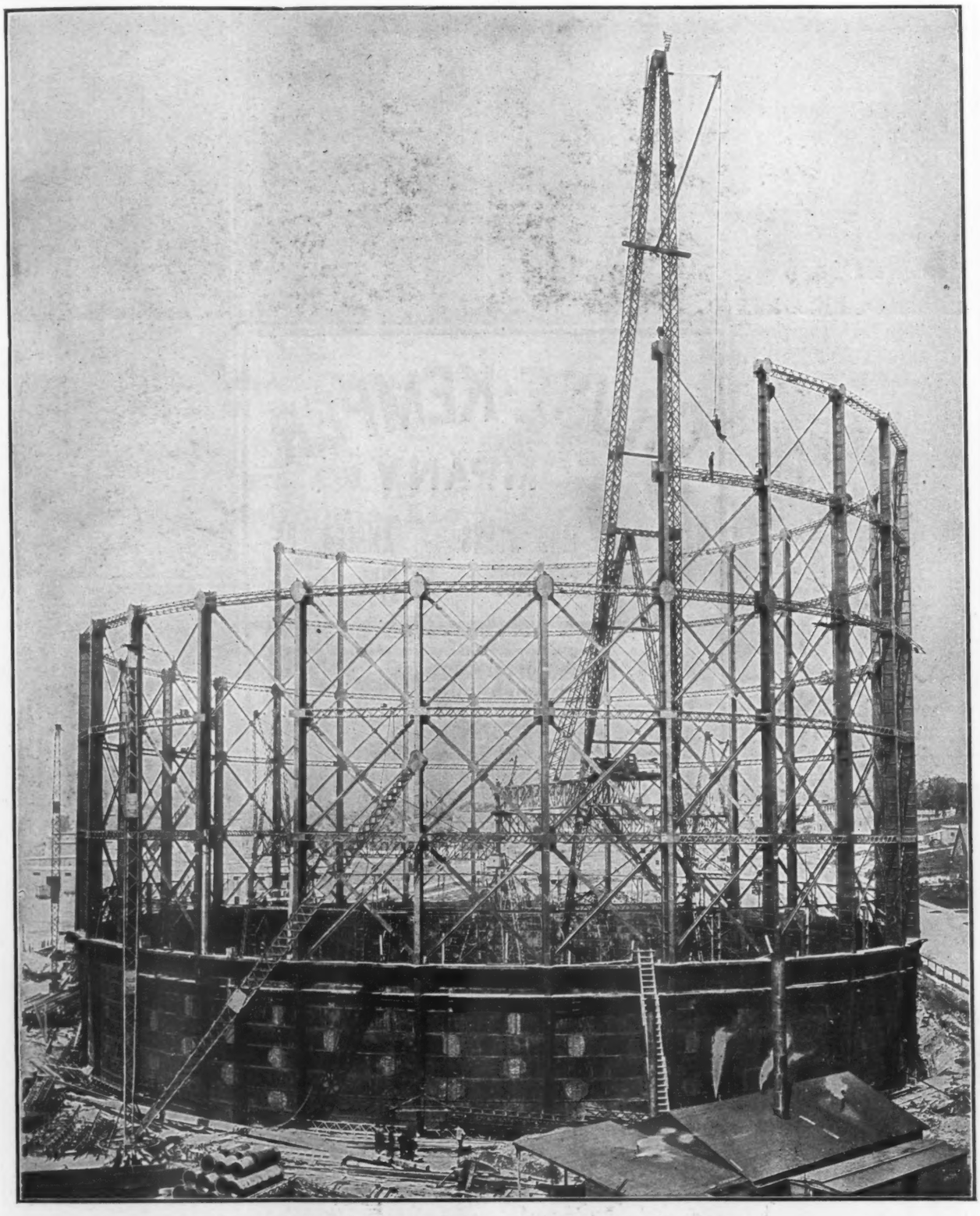

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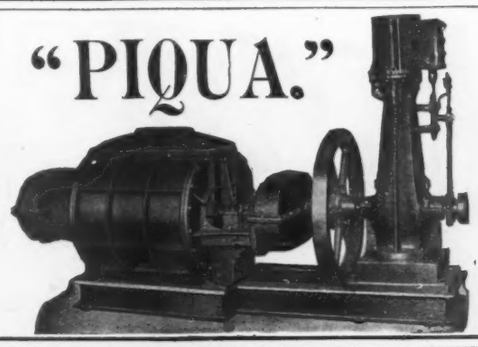

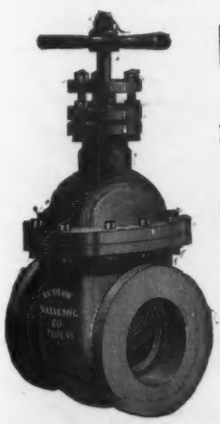

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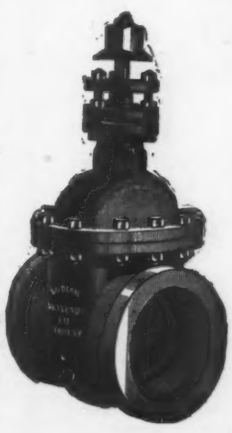

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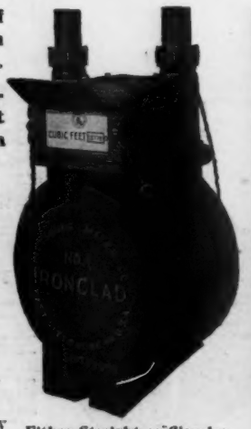

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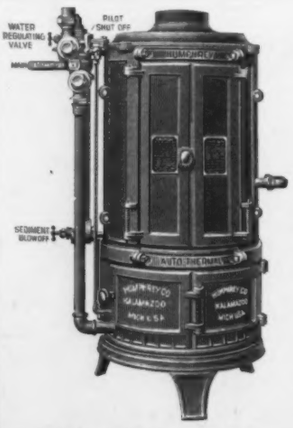

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PUBLIC LIGHTING TABLES FOR MAY, 1910.

[Communicated by The American Meter Company.]

Day of Week.	Table No. 1. FOLLOWING THE MOON. Date.	Light.	Extinguish.	Day of Week.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Date.	Complete Lighting in 1 Hour.	Complete Extinguishing in 50 Minutes.
						From Time Given.	
		P.M.				P.M.	A.M.
Sun.	1	7.30	2.30 A.M.	Sun.	1	6.47	3.52
Mon.	2	7.30 L.Q.	3.10	Mon.	2	6.47	3.52
Tue.	3	7.30	3.40	Tue	3	6.47	3.52
Wed.	4	7.30	4.00	Wed.	4	6.47	3.52
Thu.	5	7.30	4.00	Thu.	5	6.47	3.52
Fri.	6	7.30	4.00	Fri.	6	6.47	3.52
Sat.	7	7.30	4.00	Sat.	7	6.57	3.42
Sun.	8	7.30 N.M.	3.50	Sun.	8	6.57	3.42
Mon.	9	7.30	3.50	Mon.	9	6.57	3.42
Tue.	10	7.30	3.50	Tue.	10	6.57	3.42
Wed.	11	7.30	3.50	Wed.	11	6.57	3.37
Thu.	12	7.30	3.50	Thu.	12	6.57	3.37
Fri.	13	11.20	3.50	Fri.	13	6.57	3.37
Sat.	14	12.00 A.M.	3.50	Sat.	14	7.07	3.27
Sun.	15	12.30 F.Q.	3.40	Sun.	15	7.07	3.27
Mon.	16	1.00	3.40	Mon.	16	7.07	3.27
Tue.	17	1.20	3.40	Tue.	17	7.07	3.27
Wed.	18	1.40	3.40	Wed.	18	7.07	3.27
Thu.	19	2.10	3.40	Thu.	19	7.07	3.27
Fri.	20	2.30	3.40	Fri.	20	7.07	3.27
Sat.	21	2.50	3.40	Sat.	21	7.12	3.22
Sun.	22	No L.	No L.	Sun.	22	7.12	3.22
Mon.	23	No L. F.M.	No L.	Mon.	23	7.12	3.22
Tue.	24	No L.	No L.	Tue.	24	7.12	3.22
Wed.	25	7.50 P.M.	10.00 P.M.	Wed.	25	7.12	3.22
Thu.	26	7.50	11.00	Thu.	26	7.12	3.22
Fri.	27	7.50	11.50	Fri.	27	7.12	3.22
Sat.	28	7.50	12.30 A.M.	Sat.	28	7.12	3.17
Sun.	29	7.50	1.10	Sun.	29	7.12	3.17
Mon.	30	7.50	1.40	Mon.	30	7.12	3.17
Tue.	31	7.50 L.Q.	2.10	Tue.	31	7.12	3.17

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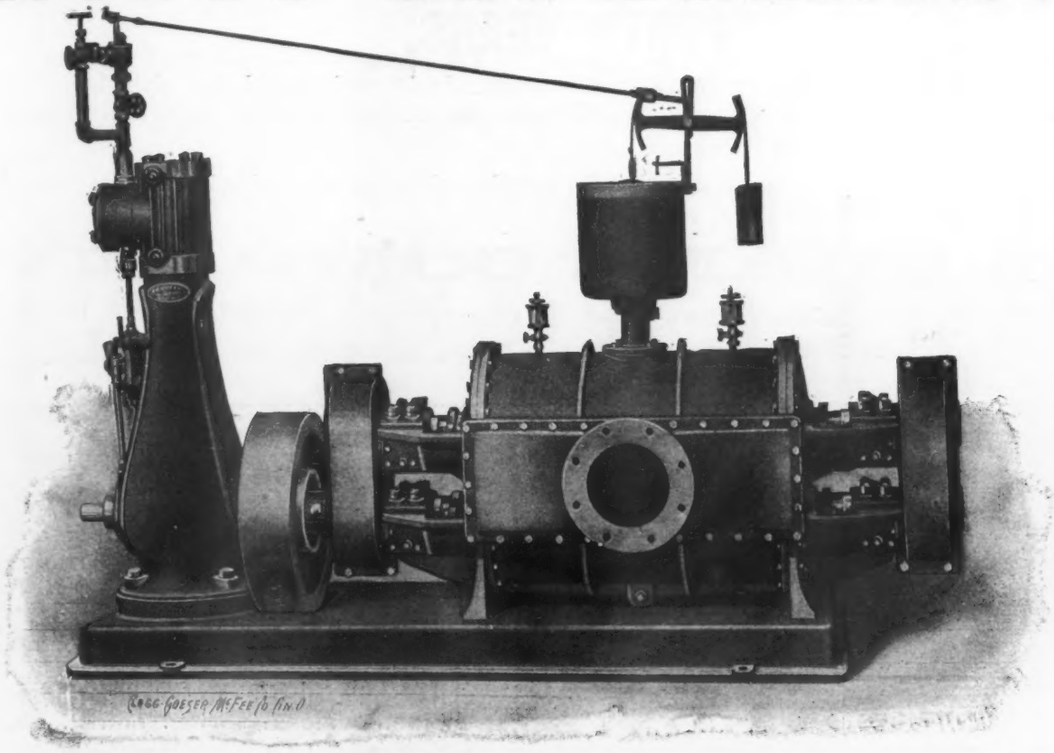

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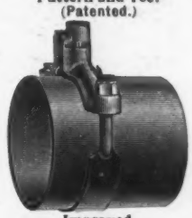

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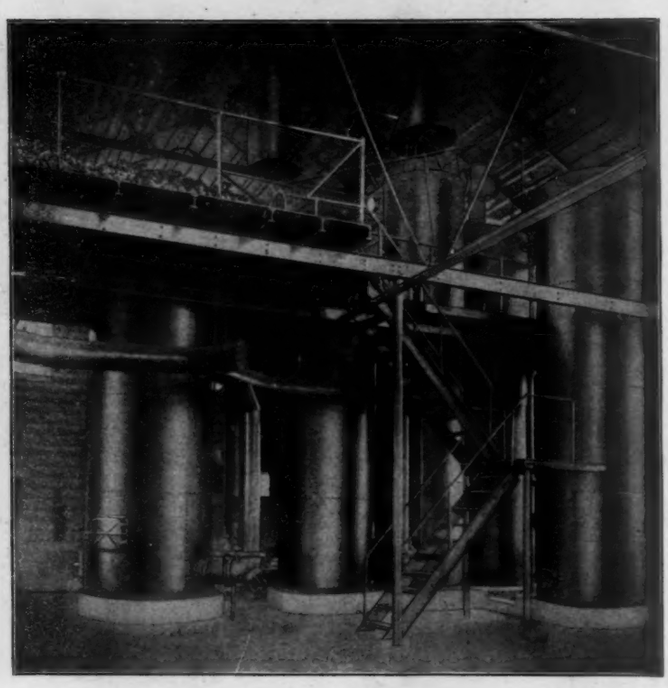

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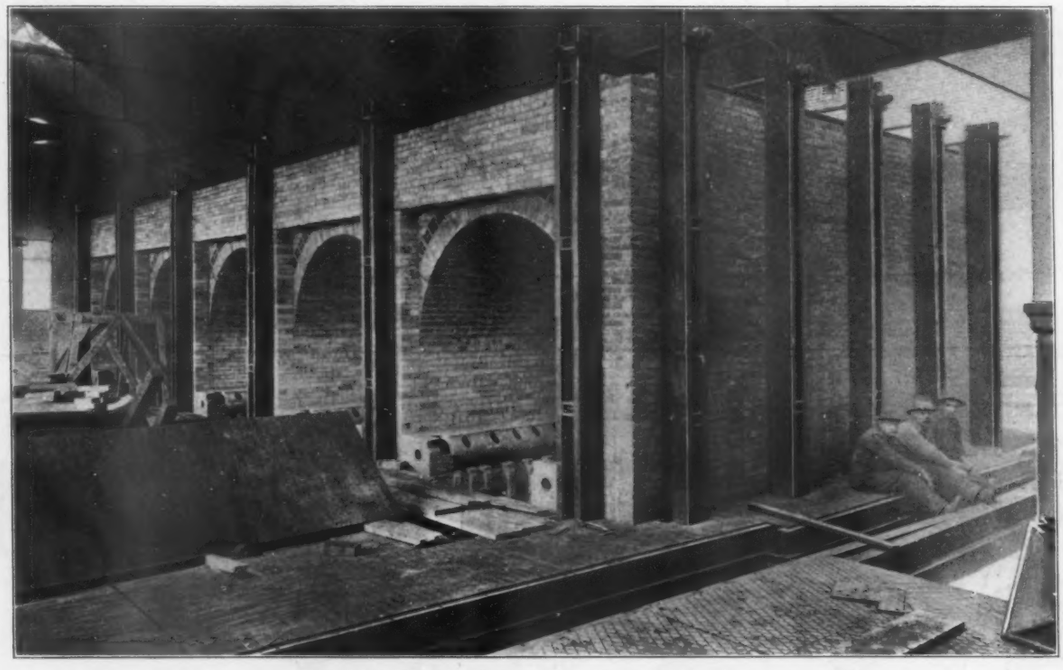

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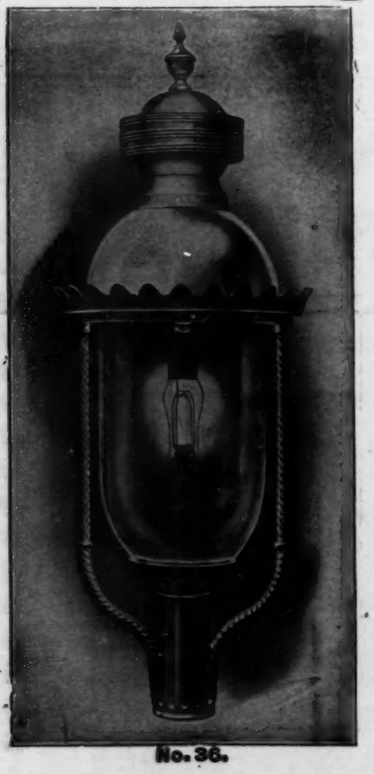

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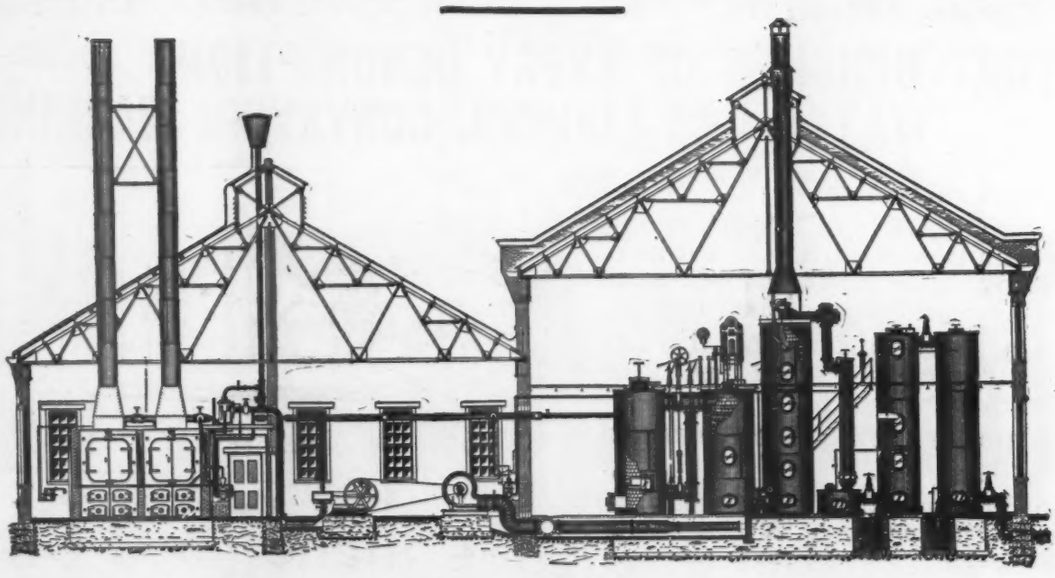

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New Bedford, Mass.	Pelham, N. Y.	Hammond, Ind.	Goldsboro, N. C.
Dallas, Tex.	Pleasantville, N. J.	Sumter, S. C.	Hoopeston, Ills.

TOTAL NUMBER OF SETS INSTALLED DURING YEAR 1909, ... 31
TOTAL NUMBER OF SETS INSTALLED TO JANUARY 1, 1910, ... 721
TOTAL DAILY CAPACITY TO JANUARY 1, 1910, ... 585,590,000 cu. ft.

Tar Extractors for Carburetted Water Gas
Photometrical Apparatus.
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Recording Gauges.
Straight Standpipe System for Coal Gas Retorts.
Straight Standpipe Cleaners.
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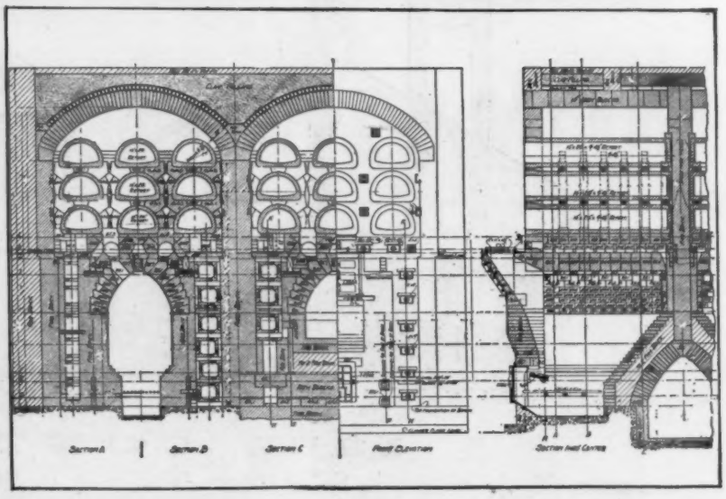

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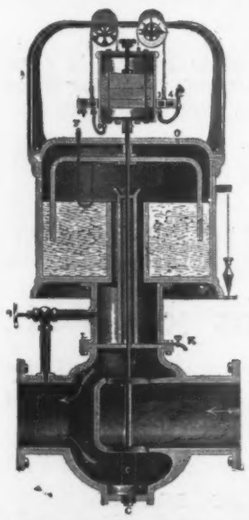

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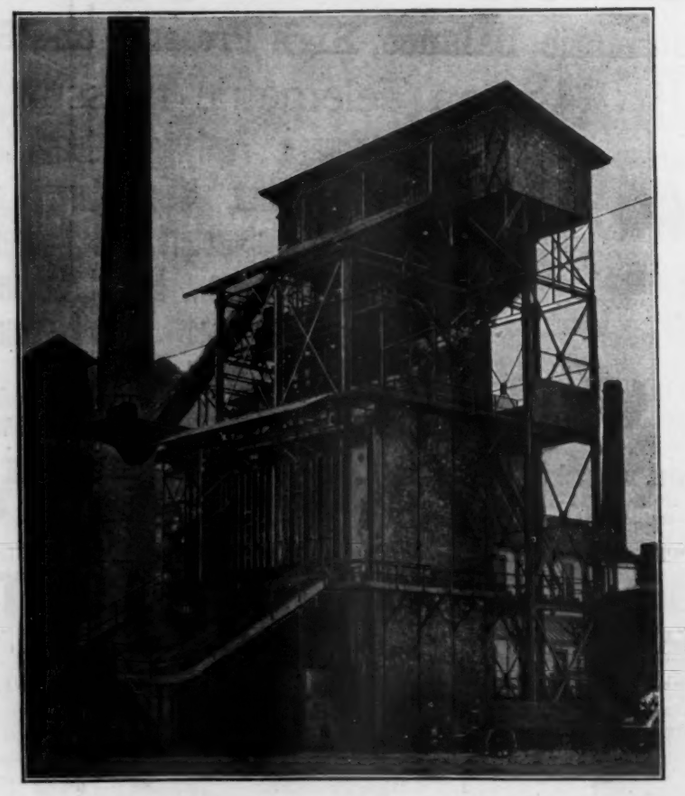

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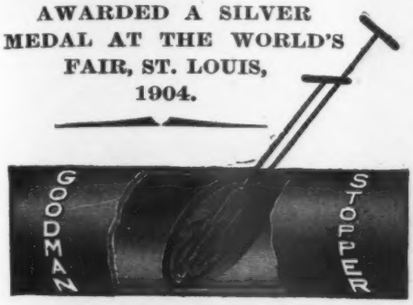

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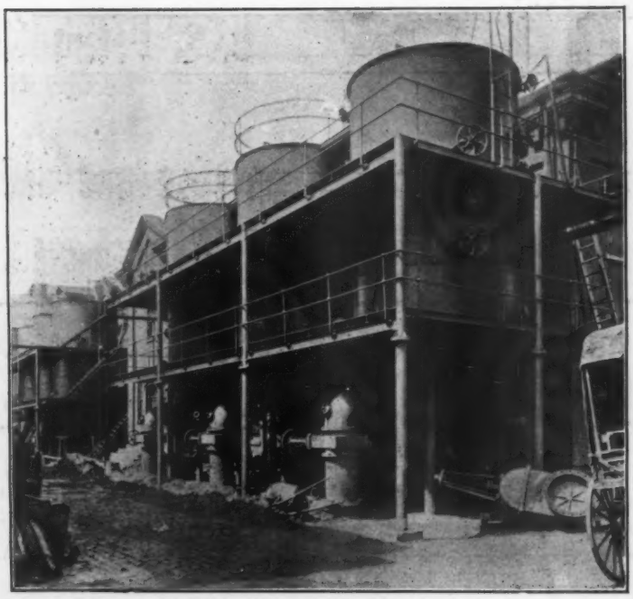

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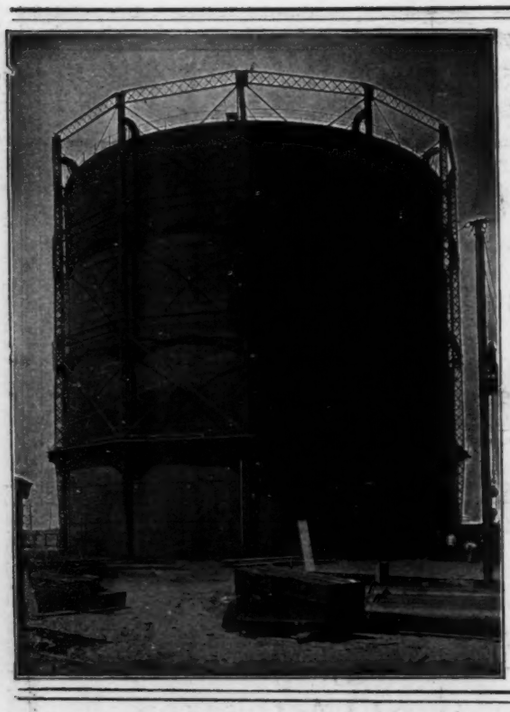

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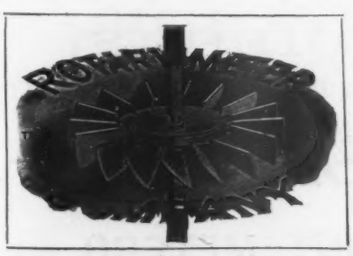

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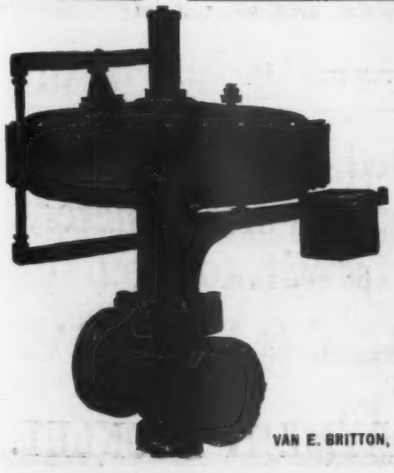

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